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arison of Prices—p. 142

Illinois U Library

The

IRON AGE

OCTOBER 28, 1948

When it's gotta fit...



BRANDT

BALTIMORE

measures up!



al stampings
ry weldments
ed steel shapes

OT 2 9 I
RLES T. BRANDT, INC. 1700 RIDGELY ST. BALTIMORE 30, MD.



YOU DON'T GO BEAR HUNTING WITH A POPGUN

IT REQUIRES suitable equipment to get results.

This is equally true in materials handling—nothing can take the place of an appropriately designed overhead traveling crane.

Whiting has more than 60 years' experience in designing and building cranes

properly engineered to their jobs—to give the utmost service at lowest cost consistent with required loads, speeds, and frequency of use.

Whiting engineers will be glad to discuss your materials-handling needs, and submit a proposal for a Whiting Overhead Traveling Crane. Let Whiting figure on your next crane.

IMPORTANT

Whiting has acquired the patents, manufacturing, and sales rights to Spencer & Morris Trambeam Systems. These, combined with Whiting Hoists, Light Cranes, and Heavy Cranes, enable Whiting to supply a complete, fully integrated overhead materials-handling system.

WHITING CORPORATION

15601 Lathrop Ave.

Harvey, Illinois

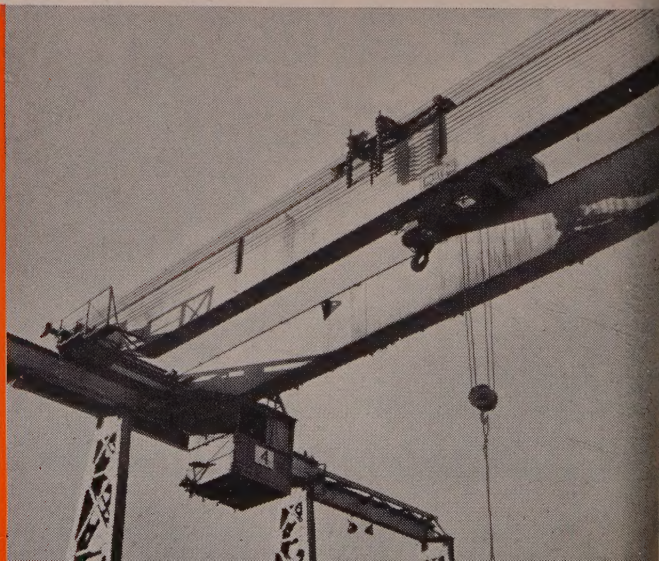
Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.

Dependable •• Quiet-Running •• Durable

WHITING
Overhead Traveling **CRANES**

BUILDERS OF QUALITY CRANES

FOR OVER 60 YEARS



FREE

to YOU—this reference book of steel information

Offer repeated by popular demand

The response to our first offering was overwhelming. But if you did not get your copy, we have a limited supply on hand to fill your request.

It's a "Pants Pocket" Book

Like so many others are doing, you'll want to carry this small but useful booklet with you on the job at all times. For it covers: specifications, weights and size extras of structural steel beams, channels, angles, bars, strip, plate, sheets, rounds, squares, etc., rail dimensions, gallonage of tanks, specifications and weights of steel tubing and pipe, standard gauges and weights of metals, with decimal equivalents in inches and pounds, S.A.E. steel specifications, gross and net ton equivalents.

Mail your request today!

Quantities on hand are limited. And we don't want to disappoint you. We will be glad to send your copy post-paid, as a token of Calumet's aim to render complete steel service.

CALUMET IRON & SUPPLY CO.

EAST CHICAGO, INDIANA

Cable Address: CALISCO

**steel fabrication • steel erectors and
dismantlers • structural steel • plates •
pipe • tubing • railroad materials**



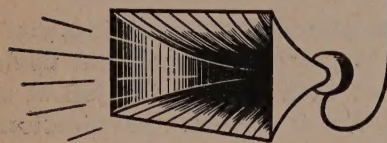
published for your service by
**CALUMET
IRON & SUPPLY CO.**
175 W. Chicago Ave. East Chicago
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Direct Chicago Phone: REG 6-1111

SHOWN ACTUAL SIZE

Thirty-two pages, with thick, reinforced cover and tough inside pages. Completely plastic-laminated throughout.

Plastic spiral binding. Clear, easy-to-read type. Book size, 4½ x 6½ — to fit in pocket.

facts speak LOUDEST



At least one type of Molybdenum high speed steel is listed and promoted on a basis of equivalent and interchangeable performance with tungsten steel, by makers of high speed steel.



Users' reports of Molybdenum high speed tools *everywhere* indicate that performance at least equals and in many cases betters that of tungsten tools.



The heat treatment of Molybdenum high speed steels is basically the same as that of tungsten steels. There is nothing in the treatment to confound those who are familiar with the heat treatment of tungsten types.



Molybdenum high speed steels save money in production—for proof send for our FREE booklet.

Climax Molybdenum Company
500 Fifth Avenue • New York City

MAIL THIS
COUPON

Please send me a copy
of your FREE BOOKLET

Name

Company

Address

HS 2-1A. 10

MOLY

Fatigue Cracks

BY C. T. POST

Organization

•• The outstanding success of one of our big Midwestern plants is generally attributed to precise organization and pinpoint controls on the entire production process.

When word went out to the shop supervisors recently to set up disaster drill organizations, it was only natural that they attacked the problem in the same businesslike fashion. One straw boss carefully prepared his routine, assigning men to buckets, doors, aisles, first aid, and rescue work. After filling the specified posts, he proudly went to his foreman to state that he was short one man. Could he borrow one or bring in a temporary employee? Evacuees? He had none.

The Chief

•• Chief Keokuk, whose drum beating has added Electro-Silvery to the vocabulary of men who melt metal, has us in a jam again. Last time he appeared, he was pictured in that astounding Indian contortion whereby his left and right hands apparently were transposed. We tossed this one off lightly, suggesting that it represented a self-portrait drawn from a mirror image. But General Motors' Edmund Ruffin has called us on it.



"Sure," he says, "a mirror reverses right and left, but it does NOT reverse fore and aft. Or did you put that in to get a rough idea of how many read *Fatigue Cracks* and how carefully?"

Humor in the Ads

•• E. R. Desoutter, managing director of Britain's Desoutter Brothers, is as quick as the portable power tools which his firm manufactures. Desoutter, as you will recall, is the ringmaster of those advertisements in which the principal performers are the "little horses" that live in his tools and a bland old gentleman with a walrus mous-

tache and a vocabulary. Not two seconds after the f.f.j. of September 2, with its *Fatigue Cracks* comment on the ads, had reached London, Mr. Desoutter put a letter on the next Atlantic flight.

"I am writing," he said, "to enquire whether these remarks were meant to be complimentary or otherwise."

By return carrier pigeon we assured Mr. Desoutter that the little horses and the bland old gentleman were welcome in our pages at any time. The reaction we had quoted, merely reflected American astonishment that British humor, somber by legend, had erupted so spectacularly in industrial advertising. Aim of all advertising, we allowed, was to attract favorable attention to its sponsor. Desoutter, it seemed, was getting attention clear across the Atlantic.

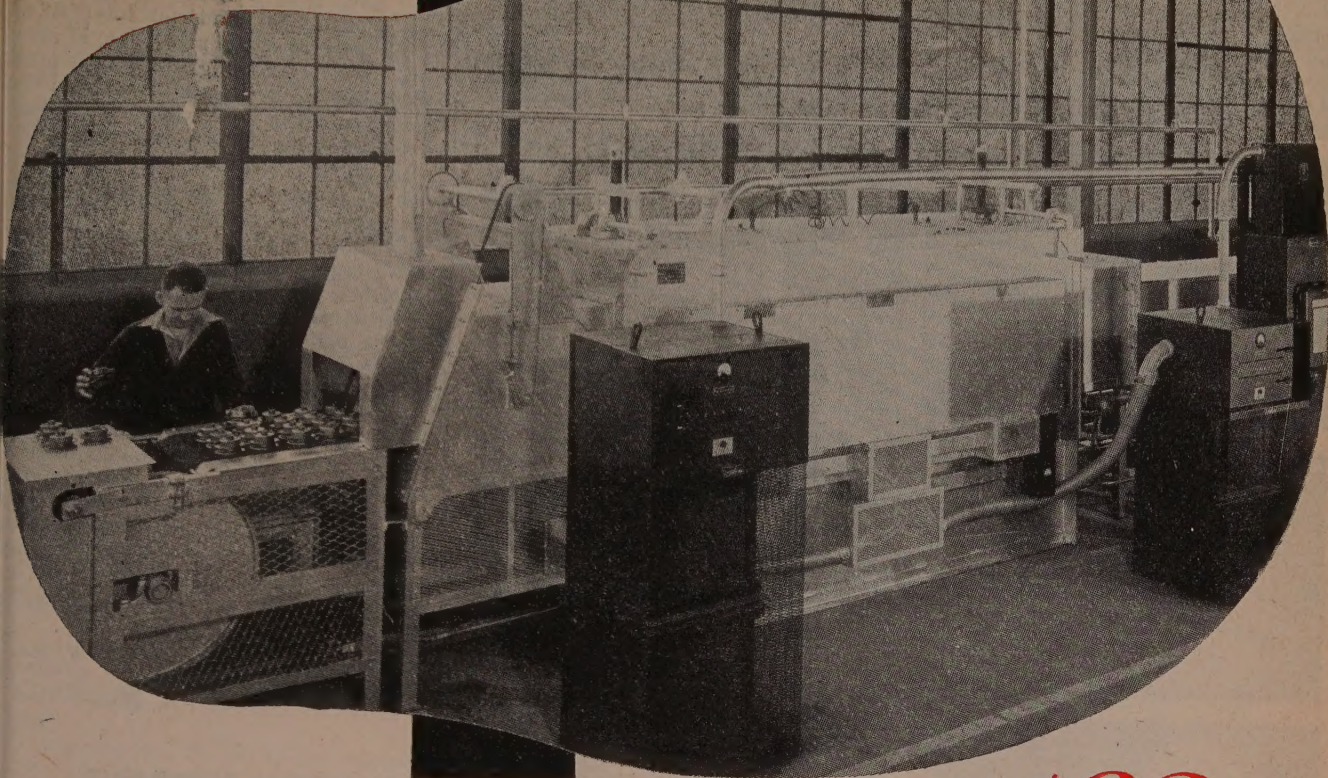
Thus reassured, Mr. Desoutter gives us a further report on Desoutter strategy. "The type of humour we use is certainly not wasted on the British reader. Our advertising, which covers some 16 technical journals, is very much appreciated by the engineering fraternity in England. We have been told in many hundreds of letters that most readers of these technical journals look forward to seeing our new advertisements and we know from practical experience that this advertising has given us and our products a very good reputation."

Possibly then, American advertisers might ponder further the warm reception which the antics of the little horses and Chief Keokuk have found in their respective hemispheres. If this should become an industrial advertising trend, it may not be long before readers of your f.f.j. are thumbing its pages with the same avid concentration that their offspring bestow on comic books.

Aptronyms

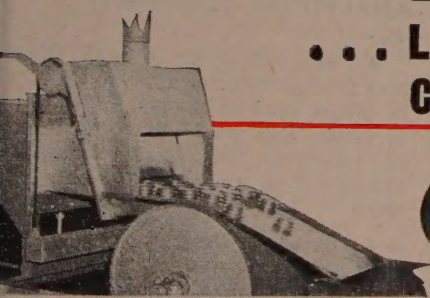
•• Our scouts report that aptonyms are sprouting like mushrooms among the Massachusetts automobile dealers. Oldsmobile dealer at Greenfield is Rollin Farr. And Bethlehem Steel's Laurence G. Hill spied an advertisement urging used car buyers or sellers to see Jesse James Motors at Weymouth. Comments Reader Hill: "It may not be an aptronym or even an anapronym, but you must admit that the man has real courage to sell used cars with a name like that."

HERE'S HOW...



... LINDBERG BRAZING FURNACE
CUTS PRODUCTION COST

\$38⁵⁰
per hr.



FIVE PARTS BRAZED IN SINGLE OPERATION



T. E. NELSON,
Vice President, Nelson
Manufacturing Cor-
poration says: "We're
constantly redesigning
cast and drop forged
parts for production
by brazing. In every
case so far we have
been able to knock
costs down plenty."

Nelson Manufacturing Corporation,
Pontiac, Michigan, manufacturers of pul-
leys, sheaves, and other stamped metal
products, braze 385 power lawnmower
pulleys per hour in Lindberg Mesh Belt

Conveyor Furnace. (435 lbs. net; 750 lbs.
gross.) Production costs are 10c less per
pulley!—a saving of \$38.50 per hour over
cost of producing pulleys as castings.

Check this "Before and After" story of
Brazing advantages.

BEFORE

Belt grooves and
center hole had to
be finish machined
with cast pulley—a
costly operation.

Cast pulley weighed
2 lbs. 2 ozs.

Rejects due to cast-
ing flaws ran at 6%.

AFTER

No machining re-
quired for brazed
pulley.

Brazed pulley
weighs only 18 ozs.
—reduces overall
weight of mower
1 lb.

Brazed pulley re-
jects—None.

Greater Production

Lindberg Brazing furnaces are designed to
produce 1½ times greater production per
sq. ft. of heating chamber area than con-
ventional brazing furnaces.

Versatile

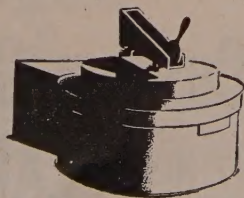
Lindberg Brazing furnaces can also be
used for low temperature silver brazing—
bright annealing—sintering of powder
metals.

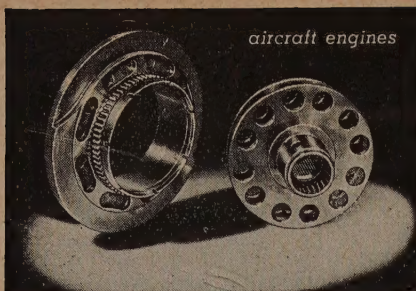
No Production Delays

Lindberg Furnaces are designed so that
heating elements can be changed in a mat-
ter of minutes without cooling furnace.

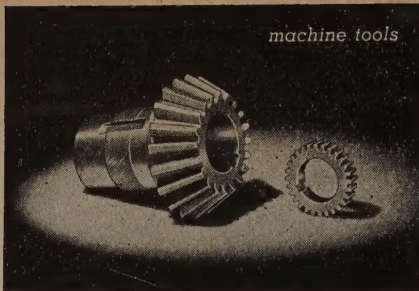
Bulletin 210 "Lindberg Continuous Pro-
duction Brazing Furnaces" is available on
request. Lindberg Engineering Co., 2452
W. Hubbard St., Chicago 12, Illinois.

LINDBERG FURNACES

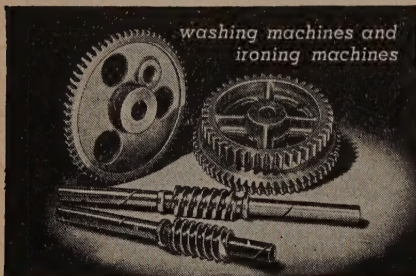




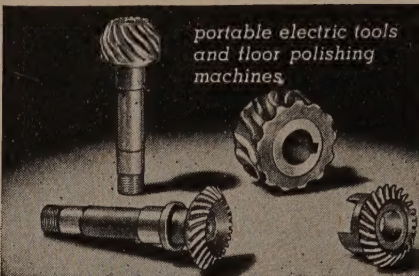
aircraft engines



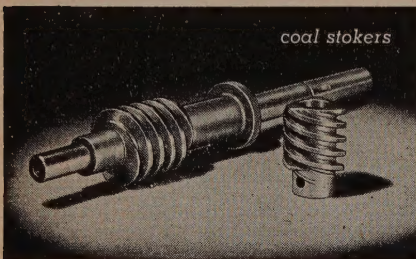
machine tools



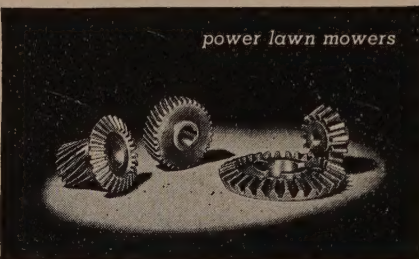
washing machines and
ironing machines



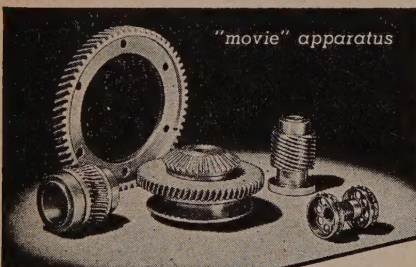
portable electric tools
and floor polishing
machines



coal stokers



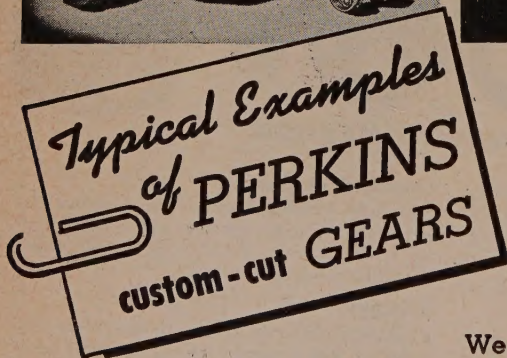
power lawn mowers



"movie" apparatus



speed
reducers



FOR A REPRESENTATIVE NUMBER OF MANUFACTURED PRODUCTS

We have specialized in the mass production of precision gears to customers' specifications for nearly 30 years. Our equipment, facilities and experience enable us to fill orders for any type of gear in any quantity and material—metallic or non-metallic. Once your specifications are in our files, re-orders are filled automatically. Let us quote on your requirements now.

YOU FURNISH THE SPECIFICATIONS — WE'LL PRODUCE THE GEARS

PERKINS Precision, Custom-Cut PERKINS MACHINE & GEAR CO., Springfield 2, Mass. **GEARS**

Dear Editor:

JAPANESE SPONGE IRON

Sir:

I have read your reports on Swedish sponge iron with deep interest, as I have studied the reduction of iron ore for a long time and have developed a process of hydrogen reduction. We have made the pure iron on an industrial scale by this process since 1933 and during the war we produced many thousand tons of pure iron. However, the plant has been shut down since the war. Sponge iron made by the process is very pure and has excellent quality. A typical analysis is 99.21 pct total Fe, 97.80 pct metallic Fe, 0.03 pct SiO₂, 0.50 pct Mn, 0.015 pct P and 0.009 pct S. From our production record over 10 years, I should say the cost of the sponge iron made is under 4¢ per lb, with further possibilities of cost reduction. I understand there is a great demand for sponge iron in the United States, and if so, it would be interesting to plan an enterprise of production by my process. If you know of anyone interested, I shall be very glad to write the details of the process.

H. KAMURA
Professor

Meiji Institute of Technology
Tobata-Shi, Fukuoka-Ken, Japan

ANALYTICAL EQUIPMENT

Sir:

We are setting up a small laboratory for quantitative analysis of metallic alloys, such as the pct Sn in bronze or brass, and would like information on relatively inexpensive analytical equipment or reagents for this type work.

LESTER SHAPIRO

Henry Shapiro & Co.
Wilkes-Barre, Pa.

● Inquiries to instrument manufacturers and to producers and suppliers of chemical reagents should give you the information you need. Names and addresses of these companies have been sent you.—Ed.

CHUCK MANUFACTURERS

Sir:

We will appreciate your sending us a list of manufacturers of a low priced line of chucks for hand drills, capacity 0 to 5/32 in. size twist drill.

H. MENDLES

Purchasing Dept.
Arrow Supply & Tool Co.
New York

● A list is in the mail.—Ed.

BRITISH REPORTS

Sir:

My attention has been drawn to your Sept. 2 issue in which you answered a request for information about the British report on German aluminum practice. The information

you gave that the report is obtainable from the Office of Technical Services, Dept. of Commerce, is true. However, the report is an official British publication (B.I.O.S. Final Report 392) and may be ordered through this office as well. The price is \$1.00. Another British document on the same subject, "Aluminium and Aluminium Alloys," is also \$1.00.

G. G. MADDISON
Supervisor, Sales Section
British Information Services

SCRAPPING OIL DRUMS

Sir:

Would you please send me any information you have regarding the companies who make machinery that could be adapted for salvaging oil drums by crushing and baling? Also the names of companies who may make a separator or sorter to separate foreign material from the cans before baling.

M. L. ZESIGER
Viroqua, Wisc.

● A list of crushing and baling equipment manufacturers has been sent. As to separation of the foreign matter, presumably oil, a list of companies making washing and degreasing machines has also been sent.

—Ed.

CAPTIONS TWISTED

Sir:

I would like to call to the attention of your readers an error in my article "Sheet Metals for High Temperature Service," which appeared in the Sept. 23 issue. The captions for figs. 8 and 9 are reversed. Also the text description of fig. 4 is not in accord with the figure itself. The white bar and black dot in the text do not agree with the chart, which is composed of black bars and white dots on black bars.

P. A. HAYTHORNE
Research Engineer & Supervisor of
Metallurgical Research
Lockheed Aircraft Corp.
Burbank, Calif.

MACHINE TOOL PROGRAM

Sir:

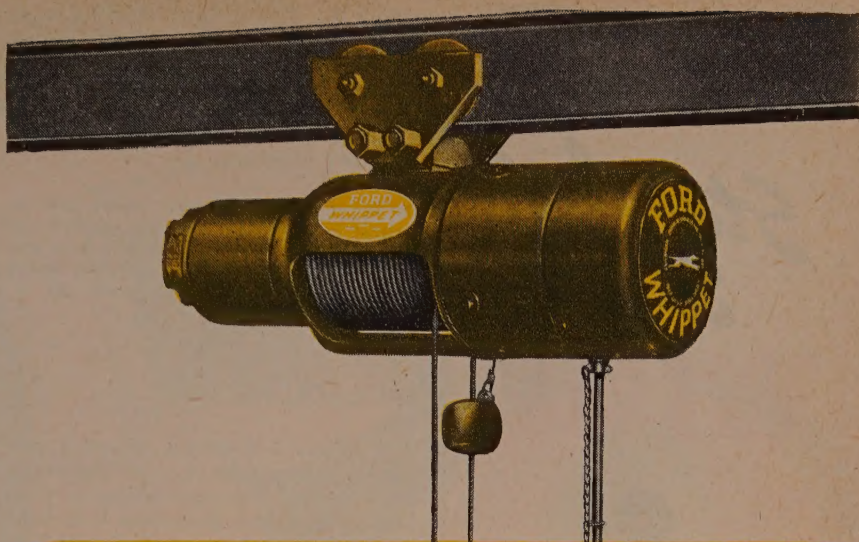
It would be greatly appreciated if you could provide the library of the National Security Resources Board with two sets of tear sheets of your "Washington" section, dealing with the NSRB machine tool program, from the Sept. 30 issue.

CAROL WANNER
Librarian
National Security Resources Board
Washington

ROLLING MILL

Sir:

I need a small used rolling mill which will take hot-rolled strip and cold-roll it from a thickness of 0.025 in. down to a thickness of 0.003 in. I would prefer to use 6-in. wide strip, but can adjust my operations to the limitations of the mill by using strip



THE LATEST WORD IN
ELECTRIC HOISTS...

SLICK AS A

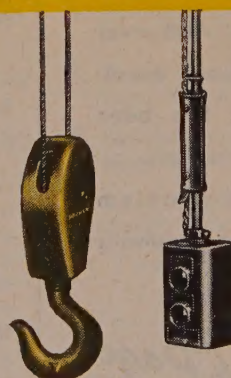
WHIPPET!



Safe. Fast. Dependable. Rugged.

The new FORD Whippet is a winner in its class. Built for production service. We believe there is no finer electric hoist made today. Whip your material handling problems with a new FORD Whippet. One-fourth to one ton capacity. Write today for a copy of illustrated folder DH-1325.

Ask your FORD distributor about the famous FORD Tribloc. He also offers a wide range of high quality spur-gear, screw and differential hoists—other special hoisting equipment.



ACCO



York, Pa., Chicago, Denver, Los Angeles, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

FORD CHAIN BLOCK DIVISION
AMERICAN CHAIN & CABLE

In Business for Your Safety

PAGE

Stainless Steel WIRE

●
ROUND
—
FLAT

OR
SHAPED

"Page for Wire—
Especially Stainless"

Remember that the next time you are looking for a responsible source for stainless steel wire. Wire has always been the business of PAGE. And ever since its earliest development, PAGE has been working with stainless.

Whatever problem you may have involving wire—

Get in touch with Page!

ACCO



Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Pittsburgh, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

In Business for Your Safety

down to 1 in. width. The hardness is 4 to 5. Again I would like to express my appreciation for your assistance in helping me locate a blast furnace last Spring.

LOGAN JONES

Minerales Mexicanos del Sur
Mexico, D. F.

● We have turned your inquiry over to several local dealers and are sending you a list of firms who may be able to help you. As you know, there has been a rather heavy demand of this type of equipment.—Ed.

PACK-ROLLING

Sir:

Will you advise me where I can secure information on the following subjects: (1) The pack-rolling of steel—the reason it is done, how it is done and with what types of steel. (2) The method of continuously casting semi-finished steel shapes. And (3) the discovery of an iron ore field in Labrador which is believed to be as rich and larger than the Mesabi deposits in Minnesota.

BERNARD W. SMITH

Jamestown, N. Y.

● The term pack-rolling is applied principally to the hot-rolling of sheets wider than 12 in. and thinner than 0.065 in. These light sheets are finished in packs of 2 to 8 sheets, according to the gage. On ordinary grades, packs of 4 and 6 sheets each are made by doubling single packs of 2 and 3 sheets, hence are known as doubles or double iron. For extremely light gages, 34 to 36, two packs of eight are sometimes matched for the last finishing process to make a pack of 16 sheets. This is a long established process and simply provides better utilization of equipment than if the thin sheets were passed through the rolls singly. You will find further information in any standard steel text, or in "Making, Shaping and Treating of Steel," published by U. S. Steel Corp. As to continuous casting, we are sending you a reprint of the article "Continuous Casting of Semi-Finished Steel" from the Aug. 19 issue which gives the latest information on this process. And in regard to the Labrador deposits, tear sheets from the March 14, 1946 and Jan. 1, 1948 issues describing the Labrador fields will be sent.—Ed.

STEEL CHAIR TUBING

Sir:

Could you give us the names and addresses of 3 or 4 manufacturers of aluminum alloy tubing and also of steel tubing for the manufacture of flexible chairs. Our customer stated that he has heard of a material called Duraluminum which is used for this purpose, but we have been unable to find out who makes this aluminum alloy. Diameters of the tubing desired are 1 in. and $\frac{3}{4}$ in.

GEORGE H. GOLD

Armando Capriles & Co.
Caracas, Venezuela

● A list of the principal manufacturers of aluminum, stainless steel and preplated steel tubing suitable for your purpose has been mailed. Duraluminum refers to a heat treated aluminum-carbon-magnesium-manganese alloy. It originally was a German

Anaconda

PHOSPHOR BRONZE

Complete range of alloys

IN SHEETS
PLATES, STRIPS,
WIRE, RODS, BARS,
SEAMLESS TUBES &
SPECIAL SHAPES

The American Brass Company offers Anaconda Phosphor Bronze in 10 standard compositions (including a free-cutting alloy) with tin content ranging from 1.25 percent to 10.5 percent.

Tell us what you make and how it's used. Our Technical Department is at your service in helping you select the correct alloy, the most serviceable temper, the most economical form.

48299

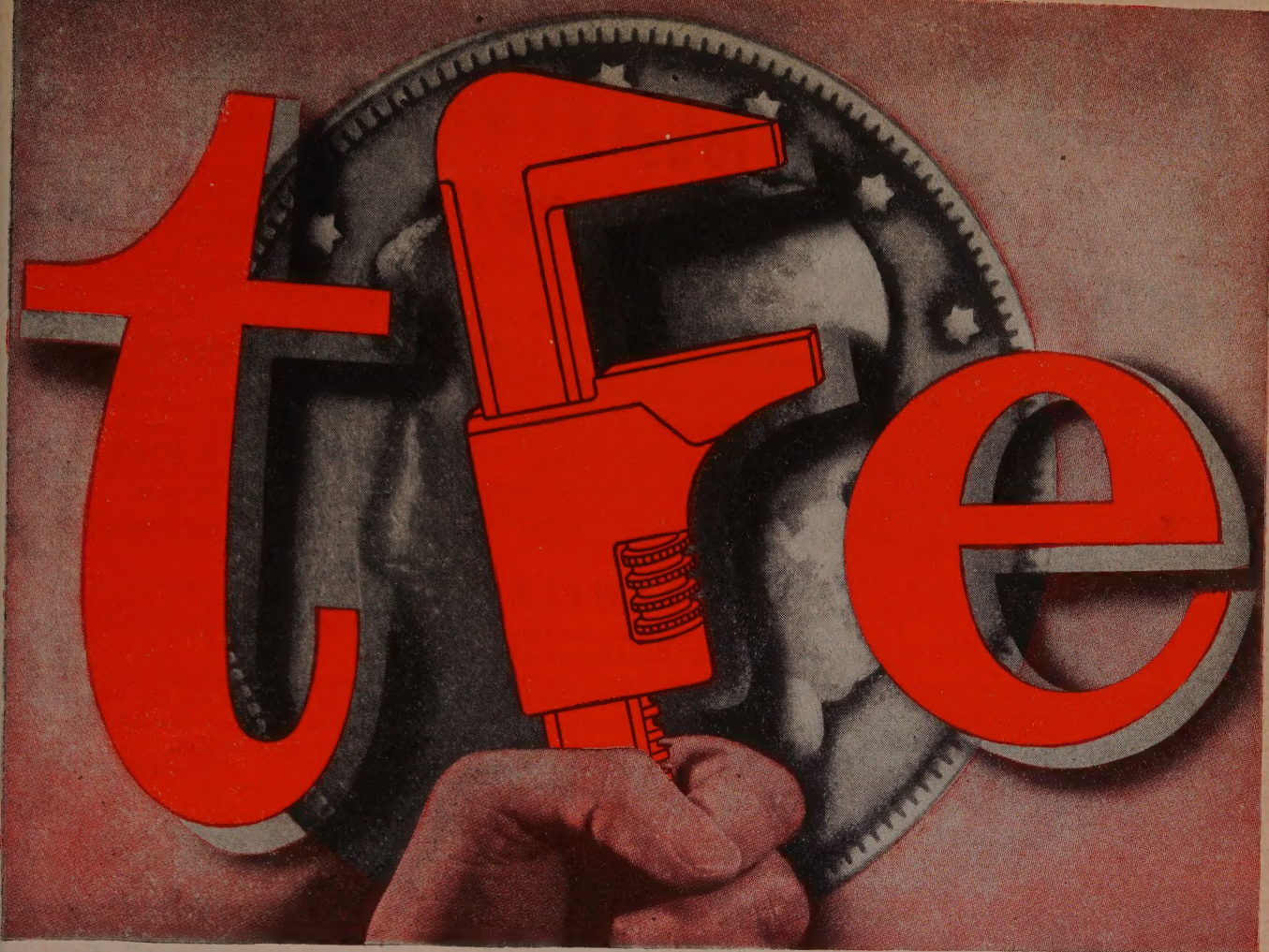


THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Co.
In Canada: ANACONDA AMERICAN BRASS LTD.,
New Toronto, Ont.

HIGH

TENSILE STRENGTH
ELASTIC LIMIT
RESISTANCE TO FATIGUE
RESISTANCE TO CORROSION
RESISTANCE TO WEAR



Tighten up on Fastening Costs the **t.f.e.** way

There are many costs involved in fastening. True Fastener Economy is the lowest *total* of them all—not a lower initial price for a bolt, nut, screw or rivet. Specify fasteners that speed assembly . . . reduce inventory . . . simplify purchasing—*there's your True Fastener Economy!*

You Get True Fastener Economy When You Cut Costs These Ways

1. Reduce assembly time with accurate, uniform fasteners
2. Make satisfied workers by making assembly work easier
3. Save receiving inspection through supplier's quality control
4. Design assemblies for fewer, stronger fasteners
5. Purchase maximum holding power per dollar of initial cost
6. Lower inventory by standardizing types and sizes of fasteners
7. Simplify purchasing by using one supplier's complete line
8. Improve your product with a quality fastener.

True Fastener Economy is the Lowest Total of All Fastening Costs

*103 Years Making Strong
the Things That Make America Strong*

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Oakland, Portland, Seattle. Distributors from coast to coast.

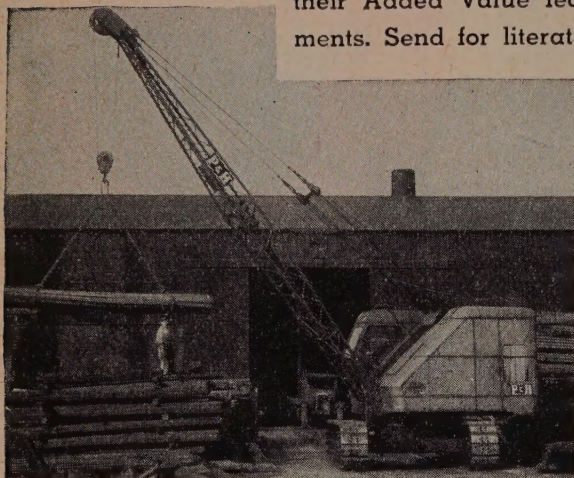


P&H

Crawler Cranes do yard jobs

FASTER, SAFER, AT A SAVING!

Have you the handling efficiency outside your plant that you have inside? P&H Crawler Cranes can give you fast, flexible, versatile yard service with one-man operation — to speed materials handling. P&H Crawler Cranes with their Added Value features are wise investments. Send for literature!

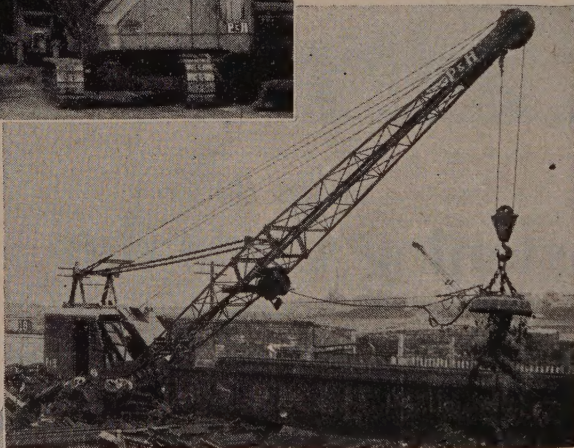


MAGNET

Equipped with magnet, the P&H Crawler Crane loads scrap quickly. For those countless lifting jobs in plant yards, you can make no better choice than a P&H. Its construction of rolled alloy steels means extra long, trouble-free service.

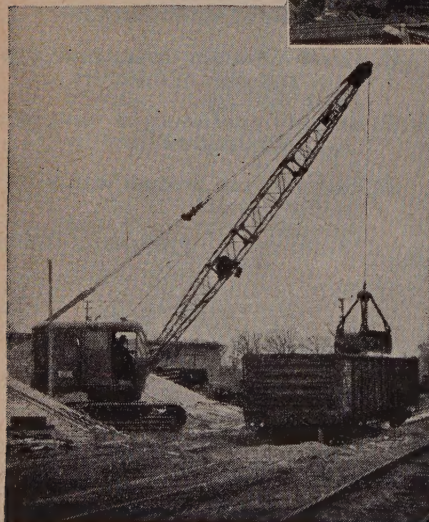
CRAWLER

P&H Crawler Cranes are easy to operate because of P&H's smooth, responsive hydraulic control. You can operate them in close quarters because of P&H's exclusive and simplified method of steering and braking.



CLAMSHELL

Bulk materials are moved speedily and easily with a P&H Crawler clamshell and movement is not restricted to in-place trackage. In addition P&H clear-view, all-weather cabs permit year-round operation.



P&H

**INDUSTRIAL
CRAWLER CRANES**
4401 West National Avenue
Milwaukee 14, Wis.

HARNISCHFEEGER
CORPORATION
ELECTRIC CRANES - DIE CASTING - P&H - WELDING ELECTRODES - RIGGING

There's a P&H Industrial Crawler Crane to Meet Your Requirements.
Write Today for Bulletins!

trade name, but was loosely used in this country during the war to refer to any alloy of this type.—Ed.

HIGH TEMPERATURE SHEETS

Sir:

Would you please send me 3 or 4 tear sheets of the article "Sheet Metals for High Temperature Service" published in the Sept. 23 issue.

I. C. CLINGAN
Director of Laboratories

Eastern Stainless Steel Corp.
Baltimore

TIME STUDY METHODS

Sir:

It will be greatly appreciated if you will send me a tear sheet copy of the article "Right and Wrong of Time Study Computations" as published in the issue of Aug. 17, 1944.

FRANK MAZUR
Supervisor, Time Study Dept.

Tube Turns, Inc.
Louisville

NONFERROUS SPECIFICATIONS

Sir:

Please find enclosed check in the amount of \$1.00 for the purchase of 4 copies of your Nonferrous Alloy Specifications booklet.

F. S. SNEDEKER, JR.
Bridgeport Brass Co.
St. Louis

CONTOUR MEASUREMENT

Sir:

Please send us a copy of the article "New Machine Speeds Turbine Blade Contour Measurements" from the Aug. 5 issue.

E. A. STALKER
Stalker Development Co.
Bay City, Mich.

LOW TIDE

Sir:

In which month of 1937 and 1938 was the lowest percentage of operation in the steel industry reported?

S. SCHENKEL
New York

● In June, 1938, operation was at 23.33 pct of ingot capacity. This was the low point, the next poorest month in that period being December, 1937, with 25.34 pct operations.—Ed.

MACHINE TOOL DEVELOPMENTS

Sir:

I have mislaid the Sept. 2 issue and since I wish to keep my file of the Machine Tool Developments page complete, I would appreciate it very much if you can send me a tear sheet of this section.

R. A. DRERUP
Asst. Mgr., Industrial Trade Sales
Lowe Brothers Co.
Dayton

INVESTMENT CASTING

Sir:

Will you kindly send us two copies of your reprints on "Precision In-

vestment Casting—Lost Wax Process." Please send us your invoice for any charges involved.

A. R. D. Corp.
Coldwater, Mich.

R. J. CAMPBELL

● The booklets have been mailed. They're \$1.00 each.—Ed.

BALL BEARING STEELS

Sir:

It is requested that 4 copies of the article "Metallurgical Aspects of Ball Bearing Steels" appearing in the Sept. 2, 9 and 16 issues be furnished this Naval Shipyard for use by our design technicians.

T. P. WYNKOOP
Rear Admiral, U.S.N.

Long Beach Naval Shipyard
Long Beach, Calif.

CARBIDE MILLING CUTTERS

Sir:

Please mail us a copy of "How to Use Carbide Cutters for Milling."

HAROLD NORBERG

Plan-O-Mill Corp.
Hazel Park, Mich.

● Copies of the book are \$1.10 each.—Ed.

ROLLED THREADS

Sir:

Recently an article "An Appraisal of Precision Thread Rolling Practice," which was printed in the Nov. 2, 9 and 16, 1944 issues has come to my attention. We would appreciate two or three copies of the article.

BURTON S. ANGELL
Analytical Engineering Dept.

Baldwin Locomotive Works
Philadelphia

HIGH STRENGTH STEEL

Sir:

Will you kindly give me the name of the concern that developed the high strength steel mentioned in Newsfront of the Sept. 9 issue.

A. L. WALTERS
Research Engineer

Battelle Memorial Institute
Columbus, Ohio

● Climax Molybdenum Co., New York. More information on the steel is given in a two-part article, "New Steel Features High Strength and High Toughness," in the Oct. 21 and 28 issues.—Ed.

IDENTIFYING METALS

Sir:

We would appreciate it if you would mail us a copy of the article "Quick Methods for Identifying Metals" as it appeared in the Oct. 17, 1946, issue.

B. F. GALLE
Production Manager

Ice Cooling Appliance Corp.
Morrison, Ill.

POWDER METALLURGY

Sir:

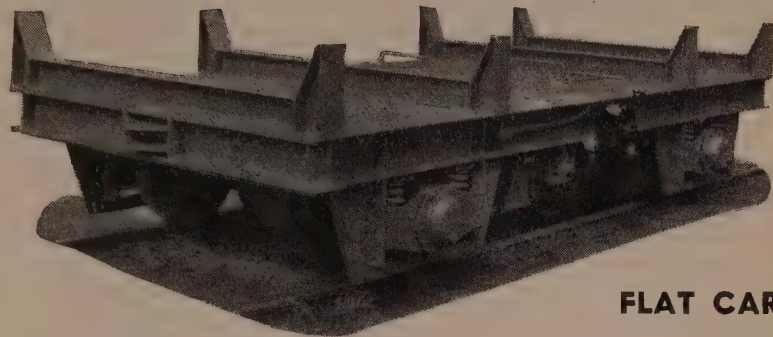
I would like to obtain a copy of the articles "Powder Metallurgy—

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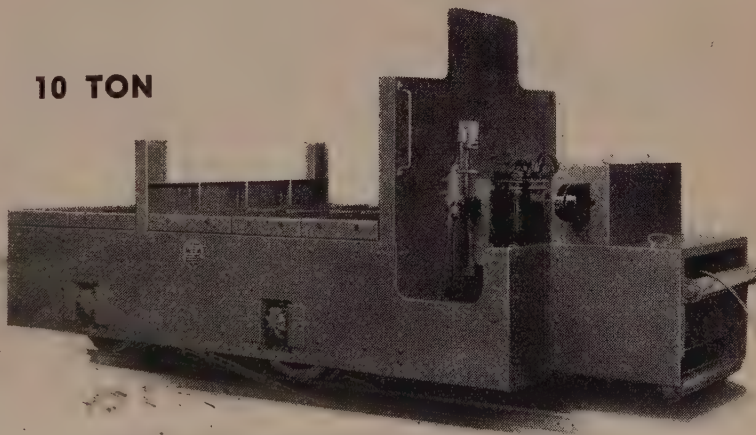


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JOHN F. MAYHEW
Representative

J. C. Tarbell Associates, Inc.
Springfield, Mass.

ELECTROSTATIC SPRAYING

Sir:

Please supply us with 5 tear sheets of the article "Electrostatic Spraying and Detearing" which appeared in the Oct. 19, 1944, issue.

C. H. WHITING
Manufacturing Consulting Div.
General Electric Corp.
Schenectady

FASTENER USAGE

Sir:

We are interested in the article entitled "Effective Use of Fasteners in Product Design" which appeared in the Sept. 23 issue, and would appreciate receiving tear sheets of same.

W. C. BARLOW
Chief Draftsman
A. V. Roe Canada Ltd., Gas Turbine
Engineering Div.
Toronto

HYDROFLUOSILICIC ACID

Sir:

I would appreciate your sending me a list of suppliers of technical grade hydrofluosilicic acid.

J. J. WALLER
Montreal

● A list is in the mail.—Ed.

MAGNETIC INSPECTION

Sir:

We would appreciate having tear sheets of the article entitled "Standards for Magnetic Particle Inspection" from the Aug. 12 issue.

WALTER W. OFFNER
X-Ray Engineering Co.
San Francisco

METAL OXIDE FILMS

Sir:

Please send me tear sheets of the article "Metal Oxide Films at Elevated Temperatures" from the Aug. 12 and 19 issues.

J. M. NOY
Climax Molybdenum Co.
Langeloth, Pa.

HEAT RESISTANT ALLOYS

Sir:

Kindly send us three copies of the three-part article "A Summary of Heat Resistant Alloys from 1200° to 1800°F" which appeared in your issues of March 18, April 8 and 15.

E. H. WYCHE
Lukens Steel Co.
Coatesville, Pa.

● The demand for this article has exhausted our supply of tear sheets. However, it has

been reprinted and copies are available at 20¢ each.—Ed.

TRADE NAMES

Sir:

Please forward, with invoice, two copies of your "Directory of Trade Names."

E. A. BARNES
Purchasing Agent

Solvay Process Div., Allied Chemical & Dye Corp.
Syracuse.

● The directories are on their way. They're \$3.00 each.—Ed.

TOOL STEEL DIRECTORIES

Sir:

We recently received 6 copies of your 20th edition of the "Directory of Tool Steels." We wish to express our appreciation of the effort you have put forth and at the same time would like to ask what the cost would be to us for 100 copies of this directory.

MERLE K. CAMERON

P. D. Browne Co.
Houston

● Your bill would be \$100. In quantities of 6 or more, the directories are \$1.00 a copy.—Ed.

PRODUCTION CONTROL

Sir:

Please send me tear sheets of the two-part article "Production Control at Caterpillar" which appeared in your June 26 and July 10, 1947 issues and also "Production Control for Small Plants" from the July 25, 1946 issue.

FRANCISCO E. CALABRESE
Rosario, Argentina

● Tear sheets of the articles have been mailed.—Ed.

FUME CONTROL

Sir:

From the issue dated Sept. 9 we would appreciate two sets of tear sheets of each of the articles "Open-hearth Fume Control" and "Metal-lurgical Aspects of Ball Bearing Steels."

E. SPIRE
Research Department

L'Air Liquide Society
Montreal

BACK ISSUE

Sir:

We would appreciate it very much if you would advise whether it is possible for us to obtain a copy of the Sept. 20, 1945 issue. There are several articles in that issue which our engineering department would like to have.

J. L. BOURQUIN
Purchasing Department

Landers, Frary & Clark
New Britain, Conn.

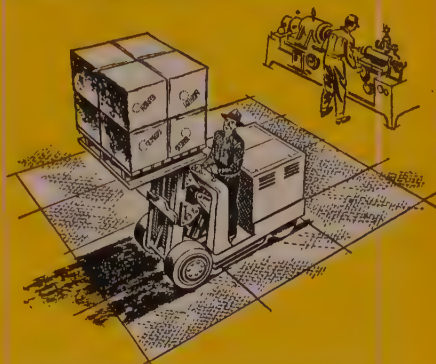
● A copy of the issue is being sent.—Ed.

HOW TO—Eliminate Slipping Accidents In YOUR Plant . . . On YOUR Products

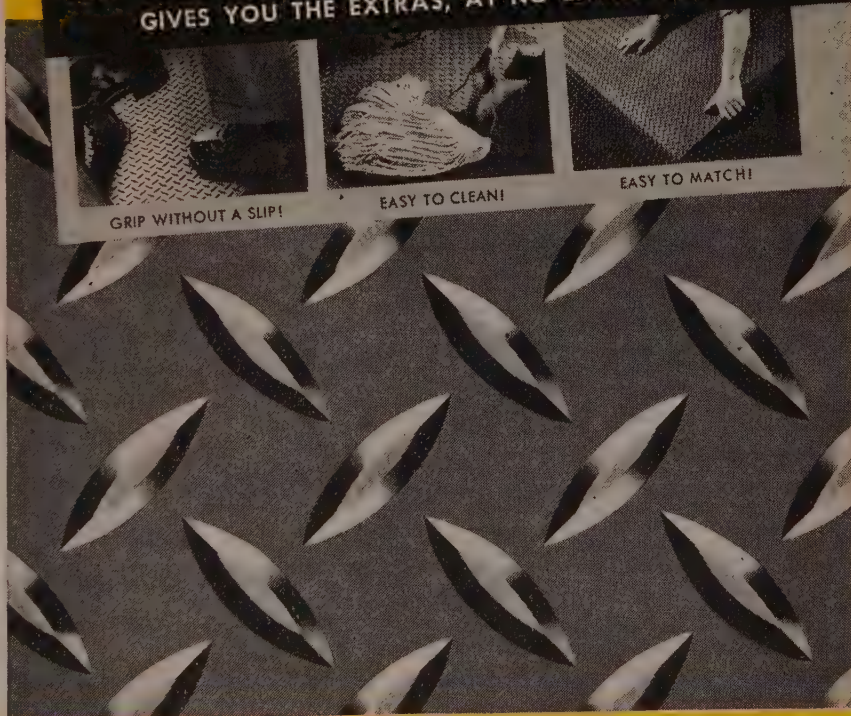
Slipping accidents cost industry thousands of dollars and hundreds and hundreds of man-hours each year. Today it is important to reduce costs and to get maximum production. AW Super-Diamond Floor Plate helps you to do this in three ways: 1. It prevents men from slipping. Wet or dry it grips without a slip. 2. Heavy traffic, oil, heat and fire do not damage it.

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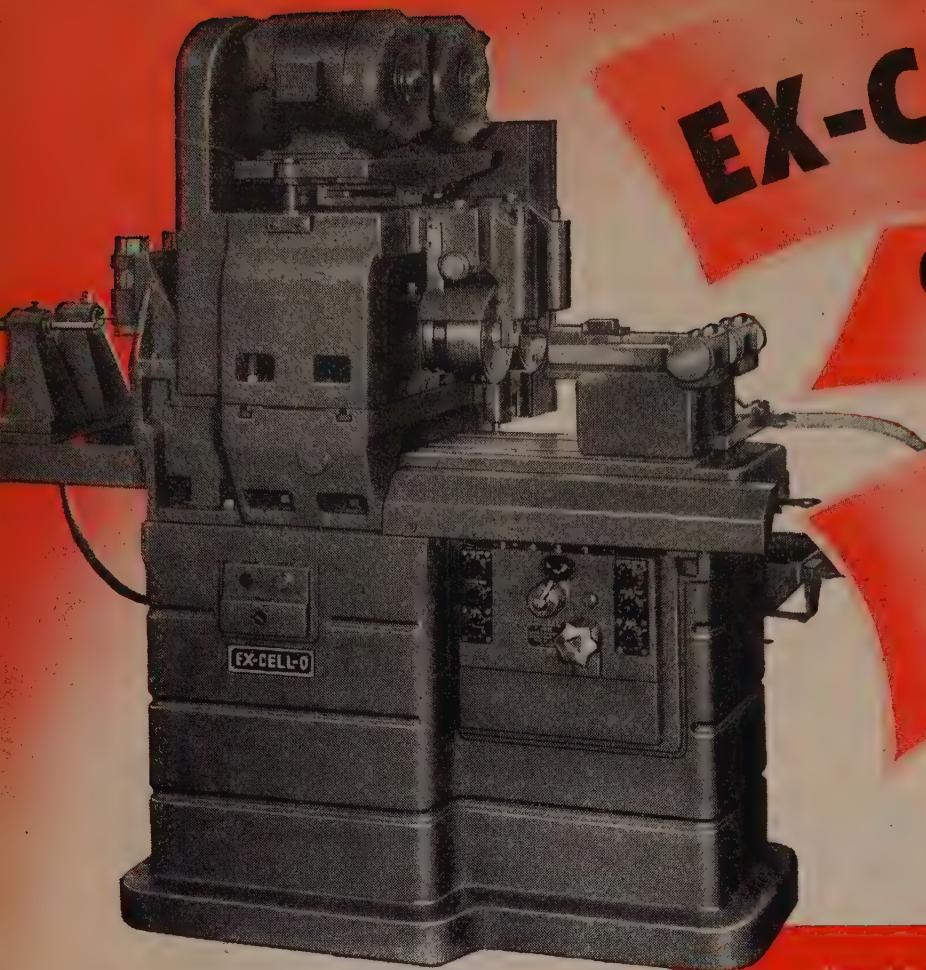


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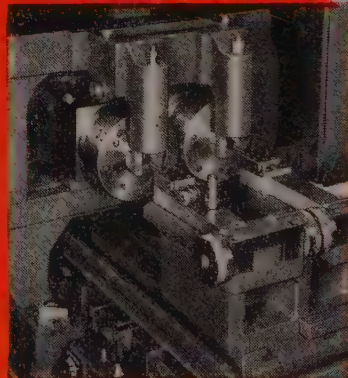


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The engineering know-how that makes possible an automatic machine such as this one is always available to Ex-Cell-O customers, whether their work requires parts in short runs or great volume. Whether tolerances are measured in thousandths or ten-thousandths, Ex-Cell-O engineers will suggest the most practical and efficient method of finishing your parts. Call Ex-Cell-O today!

Shown left view of Ex-Cell-O
Type 702-A Precision Boring
Machine equipped for automatic
rough and finish boring of valve
guide bushings. Parts enter
chutes at left end of spindle, are
fed through hollow spindle
shafts to chucks, are rough and
finish bored and ejected, all
automatically, at the rate of
300 pieces per hour.



Shown Automatic valve guide's
bore with 11/32" bore, 2-3/16"
long are rough and finish bored
the automatic manner above left.

Left View of more of same
boring bar supports. Without
bars in lower of chucks bore
is deeper, then, when lowered,
the forward travel of the chucks
bushings are withdrawn during
finishing and ejecting portion of
Graduated shafts are feeding bar
parts and ejecting system
working from 16 shafts at 16

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Indexed in the Industrial Arts Index and
the Engineering Index. Published every
Thursday. Subscription Price United
States, its Territories and Canada \$8;
other Western Hemisphere Countries
\$15; Foreign Countries \$20 per year.
Single copy, 35c. Annual Review Num-
ber, \$2.00.

Cable Address, "Ironage" N. Y.

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October 28, 1948

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How Do You Want Them?

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Find the Slave

AMONG the demands that will greet the coal operators at the next formal presentation of grievances by John L. Lewis will be one that calls for the observance of a holiday in the coal fields on February 12. This is the birthday of the shaggy thespian who leads the miners in their struggle against oppression, exploitation, yes, even slavery. In the claim for birthday honors the great Emancipator now yields to the sturdy Galahad jousting against Truman, Dewey and the odious Taft-Hartley Act.

In some respects the ham performances of this sinister man provide light relief during a political campaign from which the element of suspense—and therefore interest—has departed. He has denounced both candidates with venomous impartiality: Truman, because he invoked the provisions of the Taft-Hartley Act 31 times and sicked a hostile judge on John while he was in the act of poking a gun between the ribs of the American people; Dewey, because he is the leader of the party containing the detested authors of the statute, and had the temerity to intimate that the T-H Act was actually beneficial to labor.

It is hard to find a clearer case where pique and prejudice prevail over fact and reason. When this labor law was under consideration by Congress, the AFL bought full pages in the press to deplore the evils which the act would inflict upon labor.

"You know well how free American labor outfought and out produced the slave labor hordes of Hitler and Hirohito! Now, in victory, will labor's reward be the shackles of slavery?"

Let's look at the mine leader as Exhibit #1 in this enslavement.

During the recent UMW convention at Cincinnati, John was elected for another term of five years. It was a single slate election—the kind they have in some of the more progressive democracies. The delegates were free to say yes or keep quiet. They confirmed the right of Lewis to appoint all the officials in 21 of the 31 UMW locals.

The dues of the boys were raised from \$2 to \$4 a month and the initiation fee from \$10 to \$50. Together with a welfare levy of 20 cents a ton, the UMW has an annual revenue in excess of \$100 million. The boys at the top were also given a cost-of-living increase in salary, John's annual pay being hiked from \$35 thousand to \$50 thousand, and his two lieutenants, Thomas Kennedy and John Owens, from \$18 to \$40 thousand. On July 1 the UMW had a bank balance of \$13,184,854.

In all fairness it must be said that the boys willingly click their heels. This modern Spartacus has taken his "slaves" far. He has tweaked the noses of Presidents and defied the courts of the land. He has the power to paralyze the country and—as the event has too often proved—is perfectly willing to do so in order to gain his ends. His boys are now the best paid workers in the country. After they stop digging coal and retire they will get \$100 a month for the rest of their lives. Furthermore, John, with an eye to stormy business weather, is about to persuade the mine owners to cooperate in a spread-the-work plan. Translated quickly this means 40 hours' pay for 35 hours' work.

Maybe some one in this picture is wearing shackles—but, John—stop telling us it is you.

Joseph Stagg Lawrence

The "SHOTGUN".....

that helps give your car the NEW LOOK



(Above) Special machine for shot-blasting the rolls used in production of easy-to-draw Inland sheets, such as those being stamped into auto tops (right).



THE smooth-flowing lines of today's smart motor cars were made possible when Inland engineers developed the cold-rolled sheet *with the shot-blasted finish.*

This method of rolling steel with special shot-blasted rolls imparts a roughened surface to Inland sheets. The textured surface aids in the fabrication of deep-drawn parts, such as automobile tops and fenders. It holds the die lubri-

cant, allows better control of slippage, requires less hold-down pressure, and helps prevent scoring.

The shot-blasted roll is just one of many Inland developments providing industry with steel to fit the job. INLAND STEEL CO., 38 S. Dearborn St., Chicago. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.



...COLD-ROLLED SHEETS for Deep Drawing

OTHER PRODUCTS: BARS • STRUCTURALS • PLATES • STRIP • TIN PLATE • FLOOR PLATE • REINFORCING BARS • RAILS • TRACK ACCESSORIES

- Conversion steel is not the only item that brings headaches to the automotive industry's cost accountants. Several auto firms, it is reported, are paying \$102 a ton for Swedish pig iron and \$90 to \$95 a ton for Daingerfield, ex. pig., Lake Iron Co. of Detroit has set a price of \$75 at Buffalo—this is a new supplier who is currently being besieged by foundry buyers.
- The Lustron Corp. which builds metal prefabricated houses has some great expectations. They anticipate building 150 to 180 houses a day or about 45,000 a year. Since each house gobbles up 10 or 11 tons of steel, peak production would call for an astounding 500,000 tons annually. That they will reach peak production in the near future is unlikely. This one enterprise alone would require about 0.07 pct of the country's finished steel output. The millions of other unamished steel consumers wouldn't like that at all.
- Currency reform in Germany is already paying off in the form of substantial increases in the steel output of the Bizone area. Production during October approximated 572,000 metric tons, an increase of more than 50 pct over June when the currency reform went into effect. A study by a committee of U. S. Government and industry experts at about the same time on the ways and means to increase production also provided a helping hand.
- A manufacturer of automotive equipment has found that he can cut his operating costs materially by forming finished parts from powder metals instead of making them on automatic screw machines, die casting machines or punch presses. He has also found that brass nuts can be made cheaper from powders than from screw machined bar stock. Besides reducing his critical materials problems, he will also reduce his raw material inventory and scrap handling problems.
- The recent increase in the price of hot rolled sheet and strip by National Steel has resulted in their charging \$23 more a net ton for hot rolled 16 gage sheet than for the same size and gage of cold rolled sheet.
- Ear-to-the-ground departments in major steel companies are still looking carefully for signs of slackening in demand. They find none. The opposite is true. Quota cuts caused by bigger government programs and unfilled promises from previous months are causing more intense customer pressure. Steel people know that the bottom could drop out and they might be the last to learn of it. But so far they can't find any leaks.
- Research on jet materials conducted by the AAF, Wright Field, has revealed it may be possible to conserve strategic metals now required for engine parts subject to extreme temperatures through the use of more common metals with ceramic coatings. An example is the substitution of ceramic coated stainless steel in place of the special high temperature alloys now required for jet engine liners. Another phase of this program includes the investigation of metal bonded refractory coatings in which the refractory materials, such as alumina or magnesia, are bonded together and to the base metal by suitable metal layers or adhesives.
- Predictions in THE IRON AGE early this year that some of the postwar cars would be lighter than their predecessor models have proved to be accurate. The new Ford was the first example. A car to be introduced between now and the end of the year by a major manufacturer in the industry will be another. In each case the decrease in weight has been accomplished simultaneously with an increase in seat room for the passengers.
- Tests just completed on cast magnesium wing panels show that by comparison the cast, high purity magnesium is equal in strength to wrought aluminum on a weight strength ratio. A 21 in. long magnesium panel with a $\frac{1}{4}$ in. thick skin will withstand a 55,000 lb compressive load before showing any signs of buckling. This is equal to a compressive strength of 14,800 psi.
- Overloading of steel transport trucks is causing many a brush between truckers and state police. Railroads nod happy approval. They feel that if truckers are forced down to legal road limits, many trucking firms will have to raise rates and thus narrow the gap between them and the railroads.
- AAF jet engine research has revealed that vitreous ceramic coatings on engine parts tend to equalize surface stresses in members and dampen vibrations at high temperatures. These effects plus the reduction of corrosion fatigue are important factors in components such as turbine blades which are subjected to severe fatigue loading conditions.

X-Ray

Fluorescence

Analysis



FIG. 1—X-ray fluorescence unit as developed by the North American Philips Co., Inc.

By J. L. ABBOTT*

*Application Engineer, Industrial X-Ray Div.,
North American Philips Co.,
New York*

X-RAY fluorescence analysis provides a new method of quantitative analysis of a certain limited yet industrially important range of elements. Solid samples may be analyzed without any preparation other than to provide a flat surface approximately 1 in. square. The samples are not destroyed nor changed in any manner, so the analysis can be made on finished or semifinished products or on raw materials without loss for sampling. A large area of the sample is analyzed, thus avoiding the effects of segregation.

The method does not involve photography, thus dispensing with darkroom and photographic facilities, and eliminating the inaccuracies of film shrinkage, film developing characteristics, and the timeconsuming procedures of film developing, fixing, washing, drying, and the subsequent analysis and interpretation of the recorded data. The new analytical method is most applicable to metallic samples, although powder and semisolid samples may be analyzed by using special mounting technics and corrections for density.

A definition of X-ray fluorescence should be made to prevent confusion with visible fluorescence. Visible fluorescent radiation is produced when X rays strike a material such as zinc sulfide or other materials used for coating medical X-ray screens. The visible light produced in the screen is caused by the action of X rays on the fluorescent coating of the screen. The wavelength of the visible radiation is usually in the order of 5000 Å (visible green light).

X-ray fluorescence is similar but of much shorter wavelength and is produced by incident X radiation of high intensity; that is, short wavelength and high energy level. Thus, irradiation with high intensity X radiation of wavelengths in the order of 0.5 to 1.0 Å will cause certain elements to emit fluorescent X radiation in the order of 0.7 to 3.5 Å. By thus irradiating a sample with high intensity X radiation the characteristic radiations of the elements in the sample may be produced. X-ray diffraction methods permit separation of the heterogeneous characteristic radiation wavelengths and determination

of the intensity of each individual wavelength by the utilization of crystals as diffraction gratings and specially constructed Geiger Counters, thus providing a means of determining quantitatively the percentages of each element in a sample.

X rays may be produced by several methods. The most common method is electron bombardment of a metal target. X radiation may also be produced by other methods, including bombardment of a substance by suitable high intensity X rays. This latter procedure is utilized in the fluorescence analysis method.

When a substance is irradiated by an X-ray

nucleus increases as the atomic number of the element increases, the energy required to displace them increases, and the wavelength of the emitted radiation decreases. The wavelength of the *L* radiations ranges from 0.6A for uranium to 15.2A for copper. *M* radiation ranges from 3.5A for uranium up to 7.3A for tantalum.^{1, 2, 5}

As in all radiation phenomena, a definite energy level in the incident radiation is necessary to displace the various electrons. This energy level must be of higher intensity—shorter wavelength—than the resulting radiation released by the return of the atomic system to its stable condition. So, in order to produce the *K* radi-

A method recently devised for non-destructive analyzing, quantitatively, metallic and nonmetallic substances offers the feature whereby analyses can be conducted on finished products as well as on raw materials. The principles associated with this technique, called X-ray fluorescence analysis, are described in this first part of a two-part article supplemented with a discussion of the conditions for analyzing various substances, particularly metals.

beam the majority of the quanta pass completely through the individual atomic systems. However, there are many actual collisions between the extremely fast moving X-ray quanta and the electrons of the atoms, and when such collisions occur, the electrons are expelled from their normal positions, which are commonly considered to be orbits around the nucleus. These electrons are instantly replaced by other electrons from the outer electron orbits or shells. This replacement produces energy which is released as radiation whose intensity depends upon the distance between the original and final position of the replacing electron.

If an electron from the innermost electron orbit (*K* shell) is expelled by a high intensity quanta of incident radiation, it may be replaced

**The author is now management research engineer, Research and Engineering Div., A. O. Smith Corp., Milwaukee.—Ed.*

by electrons from either of the nearest outer shells (*L* or *M* electrons), producing $K\alpha$ or $K\beta$ radiation respectively. If *L* electrons are expelled and subsequently replaced by outer electrons, *L* radiation will be produced, and similarly for the *M* electrons. Since the innermost electrons are the most difficult to displace from the atom, the *K* electron displacements produce the highest intensity (shorter wavelength) radiation upon replacement. The intensity relationships between *K* and *L* radiation are in the order of 10 to 1. The wavelengths of *K* radiation range from about 0.1A for uranium to about 11.8A for sodium.

Since the attraction of the *K* electrons to the

tion of a given element, incident radiation of shorter wavelength is required. A large amount of incident radiation is required in order that sufficient amount of fluorescent radiation may result.

Fluorescent X radiation as a basis for quantitative analysis was first discussed and used experimentally by Von Hevesey and others as early as 1929. The theory was proven to satisfaction with the equipment then available, but the physical limitations of the X-ray tubes and ionization chambers used made the method impractical for analytical work. The fluorescent X radiation is necessarily weak because of the necessity of placing the sample external to the X-ray tube. The intensity of course decreases as a power function of the distance between the target and the sample. However, the recent availability of high-intensity, large focal-spot X-ray tubes, and Geiger Counters of high quantum efficiencies, has made the utilization of X-ray fluorescence for analysis practical.

The principles and design of X-ray fluorescence analysis equipment were developed, and the first practical equipment constructed by Friedman and Birks.^{3, 4} The principles of this apparatus have been followed in the first commercially available X-ray fluorescence analysis equipment as introduced by the North American Philips Co., Inc. Fig. 1 shows the X-ray fluorescence unit and fig. 2 is a sketch of the essentials of the unit.

The radiation from the X-ray tube, see fig. 2, strikes the sample which is placed at an angle of approximately 45° to the X-ray beam. The fluorescent radiation emitted at approximately 45° from the sample passes through the collima-

TABLE I

X-Ray Fluorescent K Spectrum Diffraction Angles
for Rock Salt Crystal

Atomic Number	Element	Diffraction Angle (θ_{NaCl}) In Degrees		
		K α	K β	K γ
20	Ca	38.57°	33.22°	32.99°
21	Sc	32.53	29.53	29.27
22	Ti	29.19	26.48	25.27
23	V	26.37	23.90	23.71
24	Cr	23.97	21.70	21.54
25	Mn	21.90	19.80	19.84
26	Fe	20.00	18.15	18.00
27	Co	18.51	16.70	16.56
28	Ni	17.11	15.43	15.29
29	Cu	15.89	14.29	14.17
30	Zn	14.76	13.28	13.15
33	As	12.05	10.61	10.88
34	Se	11.31	10.13	10.01
35	Br	10.64	9.52	9.39
38	Sr	8.94	7.98	7.85
40	Zr	8.03	7.15	7.02
41	Cb	7.62	6.78	6.65
42	Mo	7.24	6.44	6.31

Calculations:

$$\sin \theta_{\text{NaCl}} = \frac{1.00202 \lambda}{5.63937}$$

1.00202 = Correction factor for converting wavelengths in kX units to Angstrom units. (Ref. 6.)
 λ = Wavelength in kX units. (Ref. 5.)

5.63937 = Crystal plane spacing in rock salt crystal (2d) (100) plane in Angstroms. (Ref. 7.)

$$K\alpha = \frac{2 K\alpha_1 + K\alpha_2}{3} \quad (\text{Ref. 7.})$$

tor to the rock salt crystal. This crystal, acting as a diffraction grating, separates the radiation into its various component wavelengths, which are then detected and their intensities measured by the Geiger Counter.⁸

The high voltage generator is that of the conventional X-ray diffraction unit shown at the left of fig. 1. The X-ray tube is housed in the compartment at the top of this unit, in front of

which may be seen the Geiger Counter goniometer, the crystal holder, and the collimator. The cabinet at the right contains the Geiger Counter power supply, and the electronic scaling and counting circuits.

The goniometer unit is mounted on a base plate placed on top of the diffraction unit (see fig. 3). The X-ray tube is in the shielded compartment at the left; the collimator extends to the right. At the right end of the collimator is the rock salt crystal. Further to the right is the Geiger Counter housing, which is mounted on an arm extending to the quadrant. The crystal holder is also mounted on an arm, which permits accurate angulation by means of the vernier head on the quadrant. Thus, the angle of the crystal and the angle of the Geiger Counter may be accurately set to the exact values required by the Bragg reflection conditions for the wavelength of radiation desired. The entire goniometer unit may be adjusted laterally to accommodate collimators of varying lengths, permitting a choice between intensity and resolution as may be desired.

The location of the X-ray tube is shown in fig. 4. The high intensity X-ray tube is water-cooled and has a large beryllium window (not visible in the figure). The samples are placed in the turret specimen holder and rotated in any order desired into position in front of the X-ray tube window. Radiation from the tube strikes the sample and the fluorescent radiation from the sample passes into the collimator tube, which may be seen at the right. Radiation is given off by the sample at all angles, but that emitted at approximately 45° has been found to be most satisfactory.

The collimator is composed of a bundle of thin wall nickel tubing, (0.002 in. wall, and 1/16 or 1/32 in. diam). The bundle is placed in an aluminum housing such that the collimator is approximately 5/8 x 5/8 in. in cross-section. Lengths of 4, 8, and 16 in. have been used. The resolution of the various collimators is as follows:

Length, in.	Tubing Diameter, in.	Line half width, Degrees
4	1/16	1
4	1/32	0.5
16	1/16	0.25
16	1/32	0.14 (Ref. 4.)

The purpose of the collimator is to cause as nearly a parallel beam of fluorescent radiation as possible to strike the rock salt crystal. The crystal as noted, acts as a diffraction grating resolving and dispersing the various wavelengths of X radiation in the same manner that an optical grating diffracts visible and ultra violet radiation in the optical spectrograph. Long wavelengths of X radiation are dispersed to higher angles, while the shorter wavelengths are dispersed to lower angles.

The crystal disperses the various wavelengths sufficiently that each may be individually detected

TABLE II

X-Ray Fluorescent K Spectrum Diffraction Angles
for Fluorite Crystal.

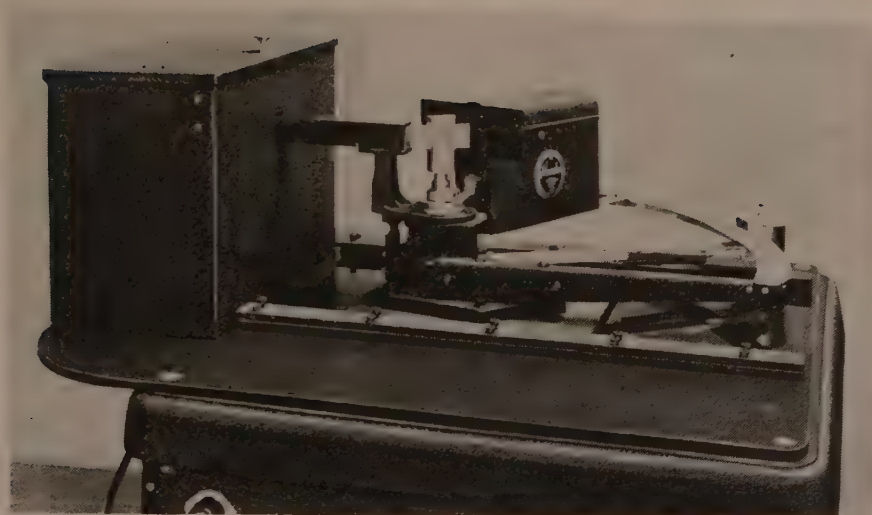
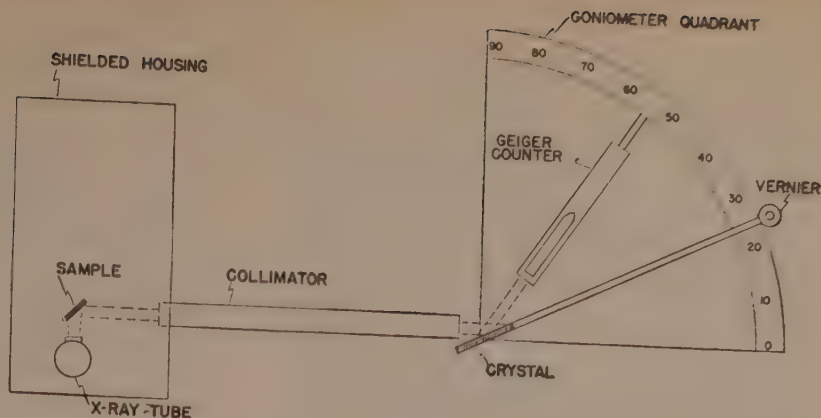
Atomic Number	Element	Diffraction Angle (θ_{CaF_2}) in Degrees		
		K α	K β	K γ
22	Ti	45.25°	40.49°	40.14°
23	V	40.40	36.15	35.85
24	Cr	36.27	32.58	32.32
25	Mn	32.90	29.58	29.31
26	Fe	30.02	26.98	26.75
27	Co	27.54	24.74	24.52
28	Ni	25.37	22.79	22.58
29	Cu	23.46	21.07	20.88
30	Zn	21.77	19.54	19.35
33	As	17.70	15.85	15.65
34	Se	16.60	14.85	14.66
35	Br	15.60	13.94	13.74
38	Sr	13.09	11.67	11.47
40	Zr	11.78	10.44	10.25
41	Cb	11.13	9.90	9.71
42	Mo	10.58	9.40	9.21
44	Rh	9.13	8.10	7.93
47	Ag	8.33	7.38	7.20
48	Cd	7.96	7.05	6.88
50	Sn	7.30	6.45	6.30
51	Sb	7.00	6.11	6.03

Calculations:

$$\sin \theta_{\text{CaF}_2} = \frac{1.00202 \lambda}{3.87214}$$

3.87214 = Crystal plane spacing in Fluorite crystal (2d) in Angstroms. (220) plane. (Ref. 8.)

RIGHT
FIG. 2—Fundamental elements of X-ray fluorescence analysis unit.



LEFT
FIG. 3—Closeup of the X-ray fluorescence analysis unit goniometer and Geiger counter.

by the Geiger Counter, and the intensity of the radiation measured. Since the intensity of the characteristic radiation from a given element is proportional to the percentage of the element present in the sample, the intensity of the radiation as measured by the Geiger Counter may be used in the quantitative analysis of the sample.

Fig. 5 shows the Geiger Counter power supply and the electronic scaling and counting unit. Power for the Geiger Counter is supplied by the lower unit. The control provides stabilized voltages variable from 900 to 2000 dc. The potential on the Geiger Counter tube is indicated by the meter directly above the control knob. Means are provided for coupling an electronic rate-meter circuit, permitting operation of a potentiometer type recorder. The rate-meter circuit may also be used for recording with a millivolt meter type recorder.

The scaling and counting unit scales down the impulses received from the Geiger Counter to bring them within the operating range of the incorporated electromechanical counter. Geometrical increments of scale reduction range from 1 to 64. A timer is used to limit counting to predetermined intervals. The resolving time of the scaler unit is better than 12.5 microseconds,



FIG. 4—Closeup of the X-ray tube and four sample turret head specimen holder in the shielded compartment.

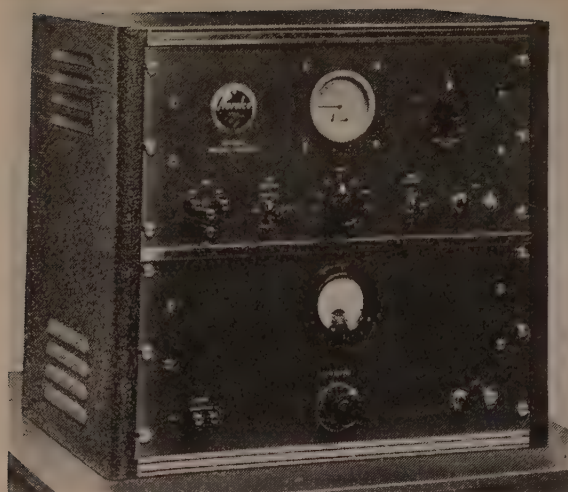


FIG. 5—Geiger counter power supply and scaling and counting unit.

and the maximum counting rate is 6400 counts per sec.

The X-ray tube may be operated up to a maximum of 50 kvp and 20 milliamperes. Operation at 36 kvp and 20 milliamperes is sufficient to excite iron K radiation, while 45 kvp is satisfactory for molybdenum.

The characteristic radiations of the elements which can be analyzed by the unit range from approximately 0.5 to 3.3A. This includes the elements from atomic No. 22 (titanium) to atomic No. 50 (tin). Under optimum conditions wavelengths up to 3.3A may be analyzed, but wavelengths greater than 3.3A are very highly absorbed by the air, thus preventing analysis of the lighter elements by this method. However, it appears possible that through the use of a suitable vacuum system, or a helium-filled system, the range may be extended to the lighter elements, possibly including aluminum and magnesium.

The shorter wavelengths of the heavier elements impose a limit because of the resolution required to separate the individual wavelengths. The limit of a rock salt crystal seems to be approximately atomic No. 42 (molybdenum), provided an arrangement is made to prevent the direct beam from entering the Geiger Counter at the low angle to which the line from this element is diffracted ($7.25^\circ\theta$). By the use of suitable crystals, such as fluorite or quartz, elements up to atomic No. 50 (tin) may be analyzed. It is possible under some circumstances to make analyses of some of the elements above atomic No. 55 by means of the L radiation lines.

However, the L radiation pattern consists of ten lines which are resolved, while the K radiation is resolved into only two lines ($K\alpha$, and $K\alpha_2$), so the analysis using the L lines is much more complicated. Under proper conditions and choice of sample, the analysis using the L lines is however practical. For instance, the determination of tungsten in steel is possible, and the determination of lead or gold in silver and less dense metals may be done satisfactorily.

With the present equipment, using the rock salt crystal, the elements between atomic No. 22 and 30, which include titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper and zinc may be analyzed without complications. With proper shielding to reduce excessive background scatter, elements up to and including molybdenum have been analyzed satisfactorily. Somewhat greater accuracy can be obtained in the analysis of the heavier elements by the use of fluorite crystal, or certain quartz cuts which provide greater dispersion because of the smaller atomic plane spacings. Tests indicate that elements up to and including tin may be analyzed by this procedure.

Table 1 shows the wavelengths in Angstroms of the K radiations of the various elements within the range of the rock salt crystal, and the diffraction angles of the various lines. Note that there is only one instance of serious interference between the $K\beta$ and the $K\alpha$ lines (vanadium $K\beta$ with a wavelength of 2.284A and chromium $K\alpha$ with a wavelength of 2.291A, and diffraction angles of 23.90° and 23.97° respectively). Resolution of other lines is sufficient to separate the $K\alpha$ and $K\beta$ radiations. Table II shows the wavelength of the K radiations of some of the elements within the range of the fluorite crystal, and the diffraction angles of the various lines. Table III shows the wavelengths of the L radiations of some of the higher elements and the diffraction angles of the strongest lines ($L\alpha_1$, $L\beta_1$ and $L\beta_2$). The wavelength data used in these tables, taken from the values given in kX units by Compton and Allison⁵ have been corrected to the true values in Angstrom Units as recommended by W. L. Bragg⁶.

TABLE III

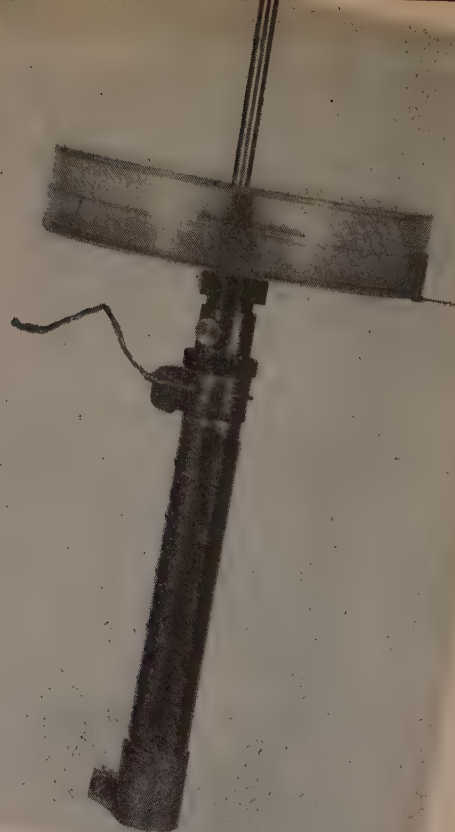
X-Ray Fluorescent L Spectrum Diffraction Angles for Rock Salt Crystal.

Atomic Number	Element	Diffraction Angle (θ_{NaCl}) in Degrees		
		$L\alpha_1$	$L\beta_1$	$L\beta_2$
50	Sn	39.67°	36.88°	34.26°
56	Ba	29.48	27.08	25.23
74	W	15.18	13.14	12.75
78	Pt	13.46	11.45	11.27
79	Au	13.08	11.08	10.94
80	Hg	12.71	10.72	10.63
82	Pb	12.03	10.04	10.04
83	Bi	11.70	9.72	9.75
90	Th	9.78	7.80	8.09
92	U	9.30	7.34	7.69

Corrected Values (Ref. 5 & 6).
Only the three strongest L lines have been considered, although there are at least ten L lines which can be detected.

In a subsequent issue the author will discuss the application of X-ray fluorescence analysis to high alloy steels and heat resistant and high temperature alloys.—Ed.

Testing Plated Metal Surfaces



Tests for plating quality, electropolishing and metal cleaning, and practical methods for plating cost determination and job estimating are described in this article. The reports are abstracts of papers presented at the 1948 annual convention of the American Electroplaters' Society.

A PAPER describing an improved instrument for measuring stress in electro-deposits and presenting formulas which may be used to calculate the stress was presented by Abner Brenner and Seymour Senderoff, National Bureau of Standards, Washington. The new instrument, designated the Spiral Contractometer, meets to a reasonable degree the criteria for an instrument suitable for both production control and research.

As the name implies, the device uses a spiral, instead of a straight strip, for the measurement of stress. A flat strip is wound to form a spiral and is plated on one side only. The stress in the deposit causes the spiral to wind more tightly or to unwind, depending upon whether the stress is compressive or tensile.

The change in the radius of curvature of the spiral indicates the stress in the plate, and is measured by the angular displacement of one end of the spiral while the other end is held rigid. The angular displacement may be magnified to any convenient degree by the use of suitable gear ratios, and can be read directly on the dial of the instrument.

It was found that by using an 18-8 stainless steel spiral for metal deposits that can be stripped with nitric acid, and a copper spiral for metals that can be stripped with hydrochloric

Abstracts of other AES Convention papers, dealing with diaphragm tanks for copper plating, bright barrel plating of nickel and zinc, a circulating electrolyte cell for strip steel plating evaluation, deposition of metals on plastics and electroplaters' metals of the future, were given in THE IRON AGE, p. 84, Sept. 16, 1948.—Ed.

acid, the spirals can be reused almost indefinitely without appreciable change in their dimensions, elastic moduli, or deflection constants, provided that reasonable precautions in handling and storing are used.

The spiral may be allowed to twist as plating progresses, and a record kept of the displacements with time, or the pointer may be clamped before the plating starts, and released at the end of the run. Successive stress determinations by these two methods gave the same results within the experimental error.

The stress is calculated from the observed deflection, the physical constants and dimensions of the spiral and the average thickness of the

coating. Thickness can be determined from the increase in weight. A lacquer coating prevents plating on the inside of the spiral. For this calculation the width, thickness and outside diameter of the spiral are measured with a micrometer. The height of the plated portion of the spiral considered as a cylinder (with the spiral compressed so that the coils just touch each other) must also be measured.

The Spiral Contractometer gives measurements of stress that are reproducible in nickel solutions to within ± 10 pct. The values agree well with reported values, with measurements made with another type of contractometer, and with measurements by procedures based on different principles.

The authors reported that values for stress in pure nickel deposits of various thicknesses, deposited under clearly defined conditions, had been established. The change in stress with thickness was investigated and shown to be related to the increase in grain size as plating progresses.

The authors also presented a simple formula for the calculation of stress in electrodeposits and showed it to be sufficiently accurate for most work.

This paper was awarded the Herminie Dorothe Proctor Prize.

Testing for a Clean Surface

THE problem of cleaning metals for electroplating and a test for surface cleanliness of steel or iron, both chemical and physical, were discussed in a paper by G. B. Hogaboom, consultant. In chromium plating over buffed nickel surfaces, a cloud or shadow may appear under the deposit caused by oxide films which were for practical purposes invisible. Similar films appear on forgings, springs and similar parts that have been oil-tempered. This film is resistant to alkali cleaning and even to acid dips.

While it may not be successful in all cases, the use of a solution of acid sodium sulfate has been found in many instances to be better than strong acid. It is especially effective on oil-tempered springs that can be rolled in a barrel. A small amount of a silica abrasive assists materially, and the treatment has not been found to cause serious hydrogen embrittlement.

Silica sometimes is deposited on work as a fine invisible material and may not be removed in rinse water. When immersed in an acid, it becomes silica gel, a strongly adherent material, resulting in pitting of the electrodeposit. This occurs more often when the article is nickel plated without an undercoat of copper from a warm cyanide solution.

A simple test for a clean surface of steel or iron, both chemical and physical, was reported. It consists of the ordinary copper sulfate dip. The composition that has been found most reliable is 5 oz copper sulfate, 1 fl oz acid and water to make 1 gal. The solution is operated at room temperature and the resultant coating of copper should be clear, semibright, of good

color, free from spots and strongly adherent to the steel.

If the slightest film of oil or grease is on the steel, the copper coating will not be adherent. Or, if a soap film remained on the steel after the cleaning process, the copper coating will be dull and not strongly adherent.

Any oxide on the steel, whether visible or invisible, similarly interferes with the copper coating and its adhesion to the steel. If the formation of the copper coating is slow, it is also an indication that the surface of the steel was not entirely clean. And a film remaining after cleaning oil-tempered steel prevents a clear coating of copper.

Vapor degreased steel will cover well with copper, provided there is no residue of solids on the material. Solids will slow up the coating and the copper will either not cover them, or in case the solids are ferrous, the copper coating will be rough and spots can be rubbed off with the fingers. The presence of any colloidal substance on the steel from the alkali cleaning solution, such as a resin or a silica, will cause an imperfect coating.

If the copper is removed by immersion in a warm, weak, sodium cyanide solution it is an indication that surface conditions caused a poor coating. If the piece is rinsed well in water and again immersed in the test solution, the coating will, if no heavy oxide is present, be clear and adherent.

Industrial Electropolishing

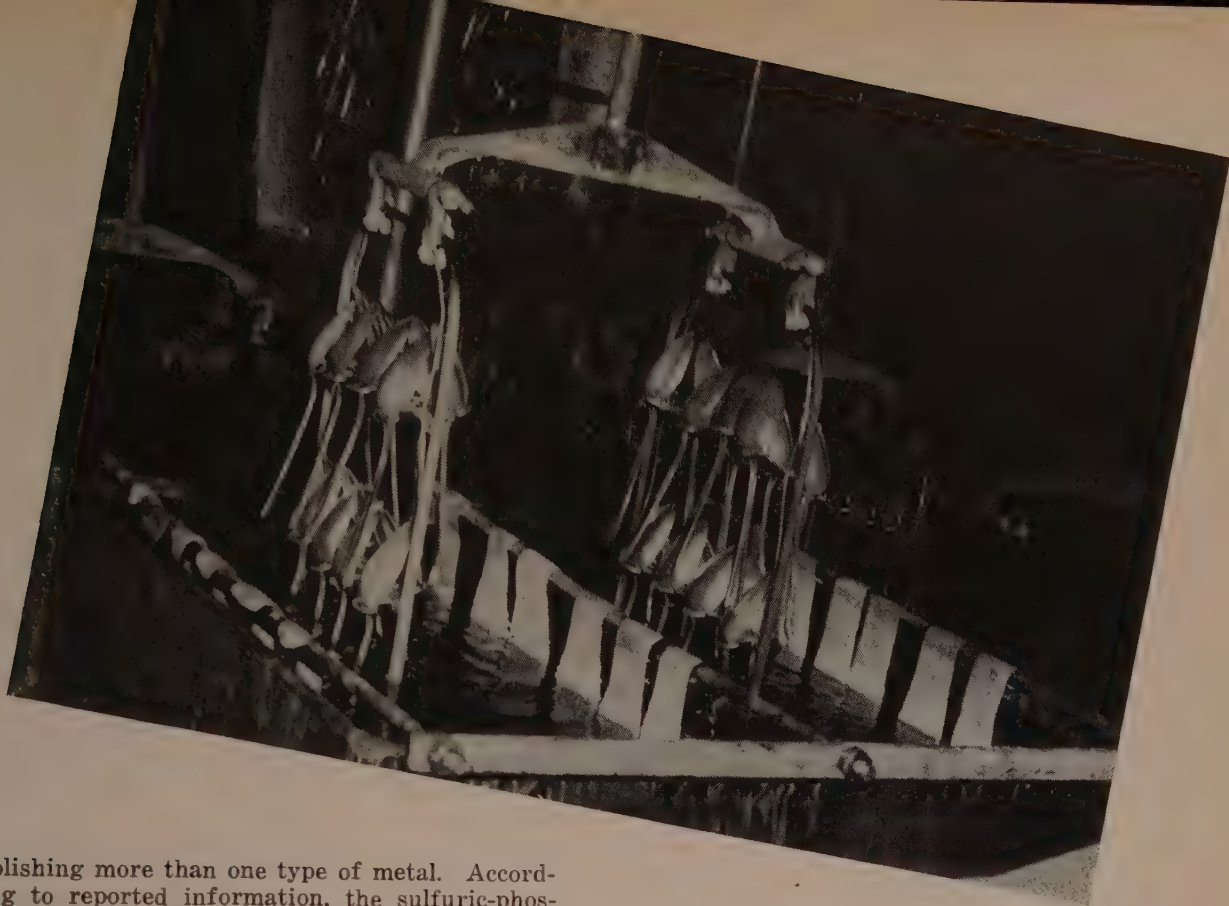
COMMERCIAL electropolishing of stainless steels, brass, aluminum, and carbon and alloy steels was discussed in a paper by C. L. Faust and E. E. Graves, Battelle Memorial Institute, Columbus, Ohio.

Stainless steel can be electropolished in baths composed of sulfuric-citric acids, sulfuric-glycolic acids, phosphoric acid-butyl alcohol, phosphoric acid, phosphoric-sulfuric acids and phosphoric-sulfuric-glycolic acid. Brass can be electropolished in phosphoric-chromic acids, and, reputedly, phosphoric acid-butyl alcohol and sodium cyanide solutions. Aluminum and its wrought alloys can be treated in sulfuric-phosphoric-chromic acids, and, reputedly phosphoric acid-butyl alcohol.

Low and high carbon steel, low alloy, tool, high speed tool and other special steels can be electropolished in sulfuric-phosphoric acids, sulfuric-phosphoric-chromic acids, and phosphoric-chromic acids.

In addition, methods of established commercial utility are immediately available for electropolishing nickel and nickel plate, using sulfuric-phosphoric acids; copper and copper plate, using phosphoric acid and phosphoric-chromic acid; and monel and nickel silver, using sulfuric-phosphoric acids or phosphoric-chromic acids.

It will be noted that some of the above bath types can be used for processing more than one type of metal. For example, sulfuric-phosphoric, phosphoric-chromic, and phosphoric acid-butyl alcohol baths can all be used commercially for



polishing more than one type of metal. According to reported information, the sulfuric-phosphoric baths have the broadest applicability of commercially practicable methods.

Operational control is principally by adjustment of chemical balance, made in accordance with amp-hr readings or sq ft processed, specific gravity measurement, and usually with weekly analysis. Operating conditions are kept at fixed levels to simplify production runs.

The paper reported electropolishing of stainless steel parts by the sulfuric-phosphoric acid process at a fourth the buffing cost. The parts involved had a 0.23 sq ft area each. For mechanical polishing of a different aluminum piece, the direct labor charge was 10¢ per part. Electropolishing cost for the same part, including labor and bath chemicals consumed, was under 3¢ each. These cost data apply to individually racked pieces and not to barrel or bulk methods.

Barrel electropolishing is being done successfully on parts having special shape advantages, but each case must be specially worked out.

Optimum results are obtained, both as to appearance and cost, with uniform, fine grained metal essentially free from seams, non-metallic inclusions, and other inhomogeneities. For most metals, excessive cold reduction, improper annealing and overpickling are reflected in electropolish appearance.

Zinc diecastings and leaded copper alloys still defy commercial electropolishing. However, one method for aluminum diecastings containing silicon has been reported.

Estimating Plating Costs

THE development of accurate methods which are simple and practical in determining and estimating job plating costs, with reasonable allowance for the unforeseen, was reviewed in a

paper by Adolph Bregman, Consulting Engineer, New York.

In a study made several years ago of 10 plating shops employing from 4 to 12 polishers, it was found that polishers' wages amount to 25 pct of cost, that all direct labor comes to 40 pct, and that indirect labor and overhead totals 60 pct.

A more detailed and in many ways more accurate system breaks costs down into the following categories: direct material, direct labor; manufacturing expense; factory cost; selling and administrative expense; total cost; and standard profit. The selling price is established from the sum of the total cost and standard profit. In this system, a standard estimate is prepared for each item, showing estimated amounts for each of the preceding categories. At the end of the month, comparisons are made between the estimated and the actual costs for each category. Substantial variations can then be spotted and investigated.

The most prevalent source of error has been found to be the omission of operations involving labor. Inspection, materials handling, rack making, rack repairing and coating, and preparation of materials have been among the most common omissions.

As a quick check or yardstick, whenever a shop's payroll totals more than 50 pct of its sales, the shop is probably operating in the red.

A survey of 25 job shops reporting their gross sales and labor costs over a 3 month period showed total gross sales of \$665,360 with factory labor costs of \$204,439—a ratio of 3.25. In the same survey, it was found that the labor-to-sales relationship varied considerably with the type

of work done—still plating, barrel plating, base metal deposition, precious metal work, etc. The sales-to-labor ratios, according to the type shop, were found to be: still plating, 2.9; gold and silver plating shops, 4.5; barrel plating, 5.1; and, still and barrel shops, 4.7.

Another survey of 20 shops, employing from 10 to 200 men, confirmed the previous sampling. The still plating shops returned from \$1.99 to \$3.36 per man-hr of labor with the precious metal shops showing comparatively high returns. Labor-to-sales ratio range was from 24 to 60 pct, again with the precious metal shops making the best showing. Barrel platers showed a high return per man-hr, but this was counterbalanced by higher investment, interest, depreciation, repairs and upkeep of equipment and other factors.

The author's conclusions are that the accuracy of estimates depends to a great extent upon the experience, skill and care of the estimator, and that the practices found best can be summarized as follows:

(1) Still plating costs may be based upon total direct labor which is multiplied by a factor to give the selling price. This factor varies with the individual plant, but in most cases, is about three. Where expensive or precious metals are involved, the cost of these metals is added to the selling price arrived at as described above.

(2) Barrel plating may be figured on a barrel-hour basis; generally about \$6 per hr for a 14x30 in. barrel.

(3) Plating in full automatic machines may be based on the machine-hour cost.

(4) Hard chromium plating is generally based on a tank-hour cost, plus labor for special racks, anodes, masking and other requirements.

(5) Lacquering, enameling and similar operations, if done by hand, are figured like still plating with the cost of materials added. If done in automatic machines, estimates are based on machine-hour costs plus the cost of materials.

Judging Plated Parts Quality

FACTORS which must be considered in evaluating plated parts—quality of finish, corrosion resistance, thickness and adherence to specifications, lack of porosity, and physical characteristics—were discussed in a paper by W. M. Philips and F. L. Clifton, General Motors Corp., Detroit.

Aside from salt spray tests, there are numerous methods for testing the porosity of plated coatings. The ferroxyl test, in which discontinuities in the coatings are indicated by a blue coloration produced by attack of the chemical reagent on the base steel, has proved useful. The hot water test is also used to check the porosity of nickel coatings on steel.

Among the methods for determining thickness of electrodeposits are the drop, microscopic and magnetic tests. The principle of the drop test is that the rate at which a plated metal is attacked by a chemical reagent is constant if the reagent employed is applied to the surface in successive drops. In the microscopic method, a specimen is cut from the test piece and mounted

in a vertical position. After polishing and etching, the thickness is measured with a calibrated eye-piece. The magnetic test works on the principle of measuring the magnetic attraction between: (1) A nonmagnetic coating on a magnetic base metal, or (2) a slightly magnetic coating on a magnetic basis metal, or (3) a slightly magnetic coating on a nonmagnetic basis metal.

In the measurement of surface quality, the Brush surface analyzer, a modification of the profilometer, is a useful tool in producing a greatly magnified image of surface contour.

Work on internal stresses in deposits of the thickness used for decoration has indicated that stress-strain determination is not the whole story, but that there must be a satisfactory relationship between stress-strain of the deposit and the brittleness. The test adopted was to plate a section of flat high carbon bumper stock with a copper flash, then to apply 0.0005 in. acid copper, 0.001 in. of nickel and the equivalent of 400 amp-min of chromium at 125 amp per sq ft. The plated specimens were subjected to a load of 1500 lb and cupped to 0.125 in. Cracking was observed visually through a magnifying glass during the test. It was found that unheated, low pH nickel did not crack, while high pH nickel did. However, heat treating relieved the brittleness in the high pH nickel.

An improvement on these methods is the pull test on plate itself. With this, the effect of temperature on tensile strength was shown. At pH 2.5, the tensile strength of nickel from a Watts solution decreased with increasing temperature. Heat treatment reduced this physical property slightly. Generally, greater tensile strength was obtained at higher current densities in the specimens as plated. For the most part, chromium plating decreased the tensile strength in the 120°F range, with a slight increase in tensile strength in the 78° and 140°F ranges. The effect of current density was to increase tensile strength at the 30 amp per sq ft value. Tensile strength increased in test samples plated at pH 5.3.

Of six bright nickels, only one showed an increase in tensile strength as a result of heat treatment. The other bright nickel baths were of the carbon-sulfur type to which heat treating, as a general rule, is detrimental.

Chromium plating had a variable effect on all the nickel plated from proprietary baths. Heat treating the chromium plated specimens reduced the tensile strength in all cases and sometimes produced such an embrittlement that the tensile test samples could not be cut.

It has been proved that the best nickel for corrosion resistance should have low stress and high tensile strength in addition to sufficient thickness and brilliance.

In the past insufficient emphasis has been put on the physical properties of electrodeposits and the new tests outlined will be of assistance not only to the control laboratory but to the research worker enabling him to test the fitness of solutions for production baths.

Industrial Applications Of Radioisotopes

The availability of radioactive isotopes for use as tracers in industrial research has opened up a number of interesting development projects. Those of special interest in the metalworking field, reported here, include studies of the mechanism of diffusion in metals and material transfer in both dry and lubricated friction.

MORE than 300 laboratories in this country and abroad have received and are using radioactive isotopes for research purposes according to the Fourth Semiannual Report of the U. S. Atomic Energy Commission.

The AEC has over 100 electromagnetically-separated stable isotopes of 29 elements available. In addition, stable isotopes of 5 other elements, produced by other methods, are also available, three from Commission facilities and two from commercial firms.

Since September, 1947, when the program of foreign distribution of isotopes was announced, 29 radioisotopes of 20 elements have been made available to laboratories outside the U. S. By the end of June, 1948, 19 nations had qualified to receive radioisotopes and 15 of these nations had received 159 shipments in all. Russia has not yet been qualified.

Utilization of the isotopes has been classified roughly into eight fields of investigation, as follows, with the number of projects involved: Medical therapy, 141; animal physiology (including human), 305; plant physiology, 77; bacteriology, 26; chemistry, 171; physics, 193; industrial research, 83; and metallurgy, 14.

Among the industrial and metallurgical research applications in this country are the following:

Dow Chemical Co., Midland, Mich., is using radioactive carbon to determine the role of carbon-containing compounds in altering the grain size of metallic magnesium.

Radioactive tracers are being used in investigating high temperature alloys for the gas turbine field by General Electric Co., Schenectady. Also, at the Knolls Atomic Power Laboratory, operated for the AEC by General Electric, radioisotopes are being used to study: (1) Self-diffusion in silver and the effect of prior thermal treatments on the selfdiffusion rate, and (2) diffusion of nickel in nickel-aluminum alloys. Both programs are to determine the fundamental mechanism of diffusion in metals.

Radiosulfur has been used to study the role of sulfur in steel industry coking processes, and is also being used to obtain better understanding of the effects and action of sulfur in metal processing by Arthur D. Little, Inc., Cambridge, Mass. (See "Radioactive Tracers in Steelmaking," *THE IRON AGE*, April 29, 1948).

Massachusetts Institute of Technology, Cambridge, Mass., is using radioiron in metallurgical diffusion studies with particular reference to steel. The program is to establish diffusion rates involved in such phenomena as annealing, hard-

ening, recrystallization, grain growth, creep and high temperature behavior. Also radioisotopes of iron and chromium are employed in tracing material transfer in dry friction between solid surfaces.

Selfdiffusion in stressed metals is being traced with radioactive zinc and copper at Stevens Institute of Technology, Hoboken, N. J.

Westinghouse Electric Corp., Pittsburgh, is using radioactive carbon to determine the diffusion of carbon in alpha iron. The data will have practical value in decarburization of carbon and alloys steels and will provide better understanding of magnetic and elastic after-effects in the aging of steels.

Radiosulfur is being used to study the mechanism of rubber vulcanization at B. F. Goodrich Co., Akron, Ohio. The company is also using radioactive iodine to measure thin film thicknesses—in the neighborhood of 1 micron—as part of an attempt to establish the mechanism by which silicones reduce adhesion of ice to rubber-like materials. Radioactive phosphorous has been used in several projects, notably one concerned with tire tread wear tests.

At Goodyear Tire & Rubber Co., Akron, Ohio, radioactive carbon is used in a thickness gage developed for thin film sheets (See "Noncontact Thickness Gage Uses Radioactive Carbon," *THE IRON AGE*, July 29, 1948); and, in other research programs, radioactive phosphorous is used to study the diffusion rate of plasticizers, and the migration and solubility of sulfur in rubber and the chemistry of vulcanization are being investigated with radioactive sulfur.

Shell Development Co., Emoryville, Calif., and some of the other petroleum company laboratories are using radiocarbon and deuterium as tracers in chemical reactions involving petroleum and petroleum products.

Socony-Vacuum Laboratories, Paulsboro, N. J., is studying the permeability of porous media to the flow of oil, gas and water mixtures with radiocobalt, and is using radioactive iron in investigations of the chemical and physical reactions occurring at lubricated surfaces.

Deuterium is being used as a tracer in the quantitative determination of the residual water or hydroxyl content of alumina by Allied Chemical & Dye Corp., New York.

Clarification and Filtration Plant

The supply of purified water for electrolytic tinning, pickling and other close control processes is a problem in many mills. This article describes the clarification and filtration plant for purifying river water which was recently put in operation at the Pittsburg, Calif., mill of Columbia Steel Co.

TO solve the problem of supplying water of controlled purity to electroplating, pickling and other critical processes, a clarifying and filtering plant for handling river water has been installed at the Pittsburg, Calif., works of Columbia Steel Co. The addition is part of the mill's recent expansion program.

Water treated in the plant originates in the San Joaquin River, with the plant supply coming from a canal forming part of the Central Valley Water Project. This canal water contains relatively large amounts of impurities that require removal before the water becomes suitable for use in the processes requiring close control.

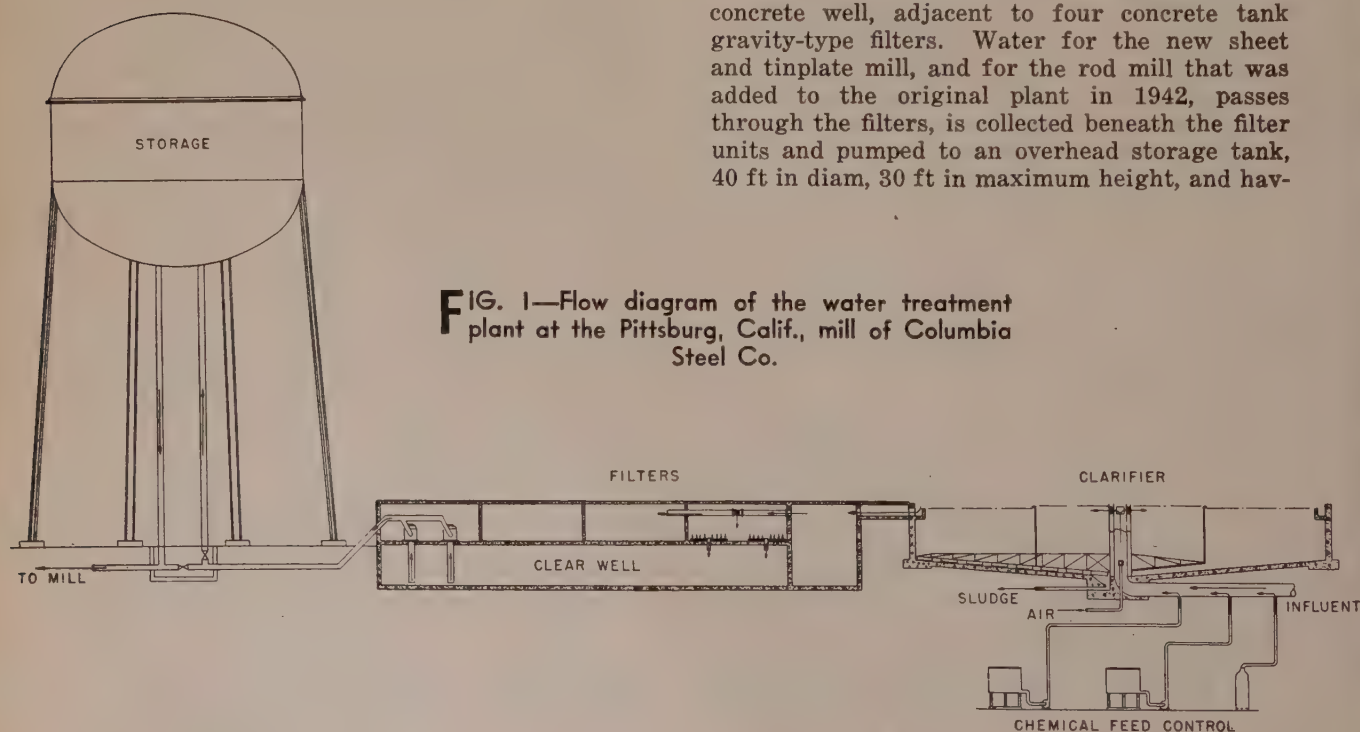
The flow diagram in fig. 1 shows the plant sys-

tem. Water intake is through an 18-in. line from the canal. A venturi-type flow meter in the line is connected to an integrating and recording instrument that provides a continuous and permanent record of water influx. The metered water passes through the clarifier, where measured amounts of sulfate of iron and lime are added at a rate commensurate with the flow of water through the clarifier.

Water in the clarifier is constantly agitated and aerated to promote the chemical reactions that result in flocculation, coagulation and sedimentation of the impurities. These settle out of the water, and are removed from the bottom section of the clarifier by a sludge pump.

The water then passes over effluent weirs, where it is chlorinated, to a deep rectangular concrete well, adjacent to four concrete tank gravity-type filters. Water for the new sheet and tinplate mill, and for the rod mill that was added to the original plant in 1942, passes through the filters, is collected beneath the filter units and pumped to an overhead storage tank, 40 ft in diam, 30 ft in maximum height, and hav-

FIG. 1—Flow diagram of the water treatment plant at the Pittsburg, Calif., mill of Columbia Steel Co.



Supplies Controlled Purity Water

ing a capacity of 250,000 gal of treated water. Water for other departments of the plant is clarified but not filtered and is pumped directly from the clarified water reservoir into lines leading to storage units of the older installations.

Piping is arranged so that the clarifier can be bypassed when maintenance or repair work is required.

Clarification Unit

The clarification unit consists of a traction clarifier mechanism driven by a 1-hp motor. It operates in a cylindrical concrete tank, 100 ft in diam and 12 ft deep, shown in fig. 2. A centrifugal blower of 400 cu ft per min capacity, driven by a 15-hp motor, supplies the air to be bubbled through the water. Sludge which accumulates in the bottom of the tank is removed by a duplex-type sludge pump with a capacity for pumping 100 gal per min.

Three tanks are provided for mixing the chemical reagents fed to the clarifier. Two of these are 8-ft diam, 6 ft deep redwood tanks, constructed of 3-in. staves with chime joists. Each tank is equipped with a mechanical agitator, mounted on steel beams over the tank, having rubber submerged operating parts. The lime is mixed in a tank 8 ft in diam and 6 ft deep, constructed of 3/16-in. welded steel plates. The mechanical agitator for this tank has a steel center shaft and mixing blade and is also mounted on support beams over the tank.

Proportioning feed pumps automatically regulate addition of reagents to the tanks. Solutions from the tanks are added to the clarifier feed by an automatic proportioner, which operates from the venturi meter that measures the intake of water to the clarifier.

The chlorinator is a manually-controlled visible vacuum type, with a capacity of 300 lb per 24 hr. Adjacent to the chlorinator control equipment is a platform scale for weighing additives. A 2-ton hoist with rail and trolley is used to simplify handling of materials.

Chlorinated and clarified water destined for use in the sheet and tinplate and rod mills is filtered in four concrete tank gravity-type filters, each of which is 24 ft wide and 18 ft long. Each filter has two bays, 10 ft wide and 18 ft long, and uses sand and gravel for the filtering media.

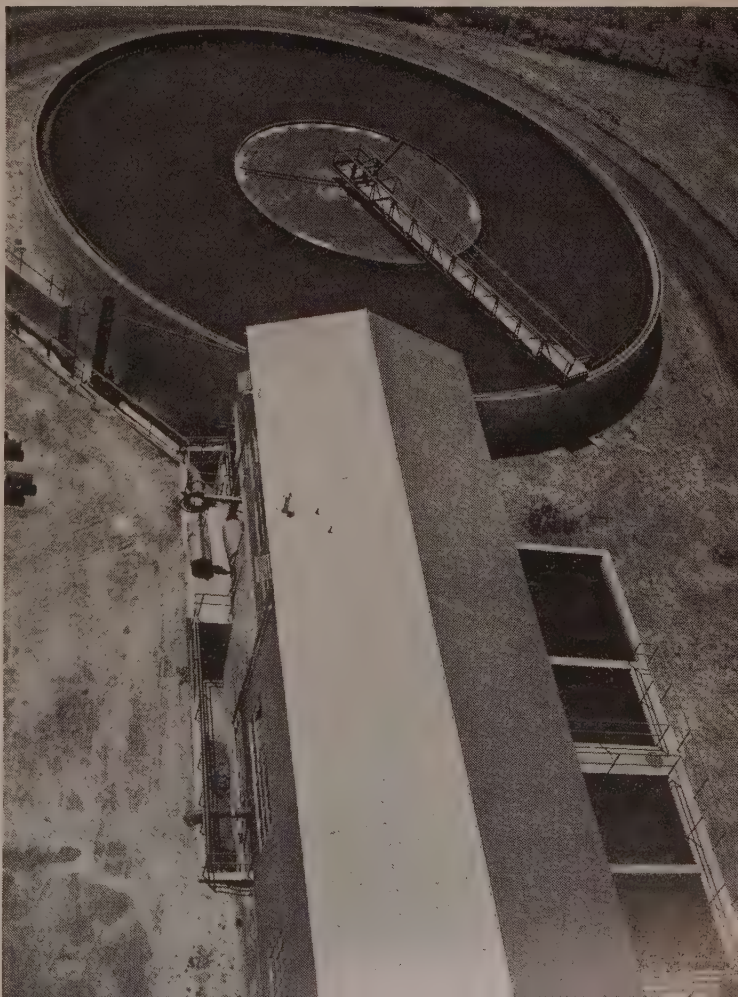
Operating tables, each with 7 valves, are provided for the filters. Gages showing rate of flow and head pressure and transfer switches are part of the control equipment. The set of hydraulic valves for each of the four filters comprises a

12-in. inlet valve, two 10-in. outlet valves, a 10-in. wash valve, a 12-in. waste unit, a 10-in. valve for effluent and a 6-in. rewash valve.

Each bay is equipped with a set of adjustable-weir water wash troughs and a set of galvanized iron underdrains.

For pumping filtered water to the gravity storage tank, two pumps in parallel that can be used interchangeably have been installed. These are 20-in. diam vertical turbine pumps, each with a capacity of 4000 gal per min at 175-ft dynamic head. Each pump is driven by a 250-hp, splash-proof electric motor.

FIG. 2—Clarification and filtration plant. Circular unit is the clarification section and rectangular tanks to the right of the main building are filter beds.



NEW WELDING ELECTRODE

Complete new specifications for copper and copper alloy and for high tensile low alloy steel arc welding electrodes, and revisions of specifications for corrosion resisting and for mild steel arc welding electrodes are discussed in this article. Chemical and mechanical requirements, coatings, current requirements and welding positions for electrodes covered by the new specifications are shown.

o o o

TWO completely new sets of specifications for welding electrodes and two sets of revised specifications have been developed jointly by the American Welding Society and the American Society for Testing Materials. The new specifications cover the increasingly popular *Low Alloy Steel Arc Welding Electrodes* and the *Copper and Copper-Alloy Metal Arc Welding Electrodes*. Under the standardization procedure of the two societies, these specifications are un-

der the jurisdiction of the AWS-ASTM Joint Committee on Filler Metal.

The revisions include the *Tentative Specification for Mild Steel Arc Welding Electrodes*, and the *Tentative Specifications for Corrosion Resisting Chromium and Chromium-Nickel Steel Welding Electrodes*.

The new specifications on low alloy electrodes encompass coated metal arc-welding electrodes for the welding of low alloy steels of weldable quality. Requirements of the specifications pertain to the tensile strength and elongation of the deposited metal and not to the high or low temperature characteristics, creep properties, or corrosion resistance. These electrodes are classified in table I on the basis of minimum tensile strengths and yield points for stress-relieved all-weld metal test specimens, the type of covering, and the type of current and welding positions of the electrodes. As in other specifications, any electrode classified under one classification may not be listed under any other classification.

Specific tests have been established for various electrode diameters of various classifications. The specifications include a summary of the tests

TABLE II
AWS-ASTM Copper and Copper Alloy Metal Arc-Welding Electrode Spec

Electrode Classification (d, e, f, g)		Chemical Specifications, Pct								
		Sn	Si	Mn	Fe	Ni	Al	P	Pb*	Cu
E	Cu copper.....	(e)	(e)	(e)	*	*	*	0.3 max	0.02 max	99.0 min. ^b
E	Cu Sn A phosphor bronze.....	4.0 to 6.0	*	*	*	*	*	0.3 max	0.02 max	balance
E	Cu Sn C phosphor bronze.....	7.0 to 9.0	*	*	*	*	*	0.3 max	0.02 max	balance
E	Cu Ni copper nickel.....	*	*	*	*	29.0 min.	*	*	0.02	87.0 min.
E	Cu Si copper silicon.....	(e)	2.5 to 3.75	(e)	(e)	(e)	*	*	0.02 max	94.0
E	Cu Al A aluminum bronze.....	*	0.55 max	*	1.5 max	0.5 max	7.5 to 9.0	*	0.02 max	balance
E	Cu Al B.....	*	0.55 max	*	3.0 to 5.0	0.5 max	9.0 to 10.0	*	0.02 max	balance
E	Cu Al C.....	*	0.55 max	*	3.0 to 5.0	0.5 max	10.0 to 11.0	*	0.02 max	balance
E	Cu Al D.....	*	0.55 max	*	3.0 to 5.0	0.5 max	11.0 to 12.0	*	0.02 max	balance
E	Cu Al E.....	*	0.55 max	*	3.0 to 5.0	0.5 max	12.0 to 13.0	*	0.02 max	balance

* Total impurities, including elements marked with asterisk (*), shall not exceed values specified.

^b Including silver.

^c Not specified.

† 500 kg. load.

†† 3000 kg. load.

^d Chemical analysis required on all classifications and all sizes.

^e Hardness tests on electrodes 1/8 in. diam and larger required on all classifications except E Cu and E Cu Ni.

^f All Weld Metal Tension tests required for all classifications of all electrodes 1/8 in. diam and larger.

^g Guided Bend Tests required on all electrodes 1/8 in. diam and larger in all classifications except E Cu Al C, E Cu Al D, and E Cu Al E.

SPECIFICATIONS

By THOMAS E. LLOYD
Machinery Editor
The Iron Age

required, showing precisely by classification number and electrode diameter which tests the electrodes will be required to pass.

The expanded use of low alloy steel arc welding electrodes and consumer requests for information

has made it advisable to issue separate specifications for these electrodes, according to AWS. The specifications are divided into two parts, part I describing the characteristics of the electrodes and outlining general requirements and

TABLE I
AWS-ASTM Specifications for Low-Alloy Steel Arc-Welding Electrodes

Electrode Classification No.	Type of Coating	Capable of Producing Satisfactory Welds in Positions Shown	Type of Current to Be Used
E 70xx Series: Deposited Metal in Stress Relieved Condition: Tensile Strength, min. 70,000 Psi; Yield Strength, min. 57,000 Psi*			
E 80xx Series: Deposited Metal in Stress Relieved Condition: Tensile Strength, min. 80,000 Psi; Yield Strength, min. 67,000 Psi*			
E 90xx Series: Deposited Metal in Stress Relieved Condition: Tensile Strength, min. 90,000 Psi; Yield Strength, min. 77,000 Psi*			
E100xx Series: Deposited Metal in Stress Relieved Condition: Tensile Strength, min. 100,000 Psi; Yield Strength, min. 87,000 Psi*			
All electrode classifications shown below are standard for E70, E80, E90 and E100 Series			
Exx10	High cellulose sodium	F, V, OH, H	Dc, reversed polarity (electrode positive) only
Exx11	High cellulose potassium	F, V, OH, H	Ac or dc, reversed polarity (electrode positive)
Exx13	High titania potassium	F, V, OH, H	Ac or dc, straight polarity (electrode negative)
Exx15	Low hydrogen sodium	F, V, OH, H	Dc, reversed polarity (electrode positive) only
Exx16	Low hydrogen potassium	F, V, OH, H	Ac or dc, reversed polarity (electrode positive)
Exx20	High iron oxide	H-Fillets, F	Dc, straight polarity (electrode negative) or ac for horizontal-fillet welds: Dc, either polarity, or ac for flat-position welds
Exx25	Low hydrogen sodium	H-Fillets, F	Dc, reversed polarity (electrode positive) only
Exx26	Low hydrogen potassium	H-Fillets, F	Ac or dc, reversed polarity (electrode positive)
Exx30	High iron oxide	F	Dc, either polarity

Types of Welds: F = Flat. H = Horizontal. H-Fillets = Horizontal Fillets. V = Vertical. OH = Overhead.
* Min pct elongation in 2 in. shown in AWS specifications.

Mechanical Properties of All-Weld Specimens				
Total (%) Impurities	Tensile Strength Min., Psi	Yield Strength (0.5 Pct Extension Under Load), Min., Psi	Elongation in 2 in., Pct	Brinell Hardness Number
0.2 max	25,000	(*)	20	(*)
0.5 max	40,000	20,000	16	70 to 85†
0.5 max	45,000	25,000	12	85 to 100†
4.0 max	45,000	25,000	25	(*)
0.05 max	40,000	20,000	20	80 to 100†
0.10 max	65,000	30,000	15	130 to 160††
0.10 max	70,000	35,000	10	160 to 210††
0.10 max	75,000	40,000	4	210 to 260††
0.10 max	85,000	45,000	(*)	260 to 310††
0.10 max	70,000	50,000	(*)	310 to 365††

part II giving details of the tests. The former is of primary interest to the consumer and the latter to the manufacturer. Included also is an appendix that goes into detail on electrode characteristics, outlining their typical uses, coating analyses, core wire analyses, and the maximum currents that can be used with each type of electrode in various diameters.

Included in the description of electrode characteristics are discussions of the E-XX16 series, a recent development in electrodes, for welding in all positions with ac as well as dc reversed polarity. Also mentioned are the E-XX25 and E-XX26 series. These are not yet commercially available. Operating characteristics are not yet known, but they are expected to be similar to those of the E-XX15 and E-XX16 electrodes except that their use will be limited as to position.

Also included in the appendix is a discussion of the properties of deposited metal from low alloy electrodes. This section discusses applications requiring weld metals of given compositions, electrodes containing molybdenum for elevated temperature applications, and stress-

TABLE IV

AWS-ASTM Corrosion Resisting Alloy Electrode Specifications

Visability Characteristics of Electrodes			Chemical Requirements for All-Weld Metal, Pct										Mechanical Requirements for All-Weld Metal			Color Marking for Electrodes	
Electrode Series and Class	Current (°)	Position of Welding (°)	C, Max (°)	Cr	Ni	Mo	Cb	Mn	Si	P	S	Electrode Series	Tensile Strength, Min., Psi	Elongation in 2 In., Min., Pct	Heat Treatment	End	Side
E308	15 16	F, V, OH, H	0.08	19.0 min.	9.0 min.	.....	.....	2.50	0.75	0.030	0.030	E308	80,000	35	none	yellow	none
	25 26	H Fillets, F														black	white
E309	15 16	F, V, OH, H	0.15	22.0 min.	12.0 min.	.....	.....	2.50	0.75	0.030	0.030	E309	80,000	35	none		
	25 26	H Fillets, F														red	none
E310	15 16	F, V, OH, H	0.20	25.0 min.	20.0 min.	.....	.....	2.50	0.75	0.030	0.030	E310	80,000	30	none		
	25 26	H Fillets, F														yellow	white
E316	15 16	F, V, OH, H	0.08	17.0 min.	11.0 min.	1.75 to 2.50	.....	2.50	0.75	0.030	0.030	E316	80,000	30	none		
	25 26	H Fillets, F														yellow	brown
E317	15 16	F, V, OH, H	0.08	18.0 min.	12.0 min.	3.00 to 4.00	.....	2.50	0.75	0.030	0.030	E317	80,000	30	none		
	25 26	H Fillets, F														green	none
E330	15 16	F, V, OH, H	0.25	14.0 min.	33.0 min.	.....	.....	2.50	0.75	0.030	0.030	E330	75,000	25	none		
	25 26	H Fillets, F														yellow	blue
E347	15 16	F, V, OH, H	0.08	18.0 min.	9.0 min.	.....	10XG 1.20 max	2.50	0.80	0.030	0.030	E347	80,000	30	none		
	25 26	H Fillets, F													(*)	gray	brown
E410	15 16	F, V, OH, H	0.12	11.0 min.	0.80 max	.....	.....	0.60	0.75	0.030	0.030	E410	70,000	20	(*)		
	25 26	H Fillets, F													(*)	gray	green
E430	15 16	F, V, OH, H	0.10	15.0 min.	0.80 max	.....	.....	0.75	0.75	0.030	0.030	E430	70,000	20	(*)		
	25 26	H Fillets, F													(*)	gray	blue
E502	15 16	F, V, OH, H	0.10	4.0 to 6.0	0.40 max	0.45 to 0.55	.....	0.75	0.75	0.030	0.030	E502	80,000	20	(*)		
	25 26	H Fillets, F													(*)	gray	

a Where dc is specified, reversed polarity (electrode positive) is required.

b F = Flat; H = Horizontal; H-Fillets = Horizontal Fillets; V = Vertical; OH = Overhead.

c Specimen heated to 1550 to 1600°F, held for 2 hr, furnace cooled at max of 100° per hr to 1100°F, and air cooled.

d Specimen heated to 1400 to 1450°F, held for 4 hr, furnace cooled at max of 100° per hr to 1100°F, and air cooled.

e Carbon shall be analyzed to nearest 0.01 pct.

relieving of weldments fabricated from low alloy electrodes.

The *Tentative Specifications for Copper and Copper-Alloy Metal Arc Welding Electrodes*, approved by the board of directors of AWS on June 23, 1948, and by the ASTM administrative committee on standards on Aug. 3, 1948, cover metal arc welding electrodes for welding copper and copper alloys. In the past copper alloy electrodes have been used primarily for repair welding of cast iron, welding dissimilar metals and depositing overlays for bearing, wear and corrosion resistance. More recently, in addition to these uses, they have been used in fabricating copper and copper alloy weldments, and have been particularly useful in fabricating chemical processing equipment because of their low temperature and corrosion resistant characteristics.

These electrodes are classified on the basis of both mechanical properties and chemical analysis of the deposited weld metal as determined by tests prescribed in the new specifications. The chemical analyses of the ten electrodes included in the specifications are shown in table II, as are the mechanical requirements.

The guide to the AWS-ASTM classification of these electrodes, included as an appendix to the specifications, contains considerable specific information for both the manufacturer and user. It is not mandatory nor does it form a part of the specifications, but is added to aid in determining the particular electrode best suited for a specific application.

The electrodes are arranged in five basic groups, each based on the primary alloying element in the electrode. The groups are: E Cu (copper); E CuSn (phosphor bronze); E CuNi (copper nickel); E CuSi (copper silicon); and E CuAl (aluminum bronze). Where a particular type of alloy is covered by more than one classification, individual classifications have been identified by the letters: A, B, C, etc.

The E Cu electrodes are of deoxidizing copper core wire and are used where high electrical conductivity or corrosion resistance comparable to annealed, wrought copper is sought. Properties

of the weld metal may be improved by cold working followed by annealing to restore ductility.

The E CuSn electrodes are used for joining copper, phosphor bronze of analysis similar to either of the electrode types, low strength brasses, cast iron and other ferrous and dissimilar metals. They are also used for surfacing for bearing, wear and corrosion resistance. E CuSn-A electrodes are suitable for welding copper when their lower electrical conductivity is not objectionable and their chemistry is suitable from a corrosion resistance standpoint. E CuSn-C electrodes are useful where greater hardness is desirable. These possess higher ultimate tensile strength and yield strength than E CuSn-A electrodes.

E CuNi electrodes are commonly used for joining 20 and 30 pct copper-nickel sheets and plates, and for joining these metals to steel, cast iron and the nickel-copper alloys.

The copper-silicon (ECuSi) type may be used for welding copper and for overlaying cast iron, steel, and other metals to provide corrosion resistance, wear resistance and bearing surfaces. These electrodes are used in fabricating chemical apparatus from plate, sheet and castings of copper-silicon alloys. While the use of metal arc welding for these electrodes is relatively new, welding by oxyacetylene and carbon arc has been common.

There are five E CuAl types of electrodes, characterized by high tensile and yield strengths and relatively high hardness. The E CuAl-A electrodes are used for welding high strength copper-zinc alloys, aluminum bronzes or similar composition, many ferrous alloys and combinations of dissimilar metals. These can also be used for overlays for bearing, wear and corrosion resistance.

E CuAl-B electrodes have a slightly higher tensile strength and lower ductility than E CuAl-A electrodes, and are used for similar applications where higher tensile strength is desirable and lower ductility is not objectionable.

E CuAl-C electrodes have the highest tensile
(CONTINUED ON PAGE 131)

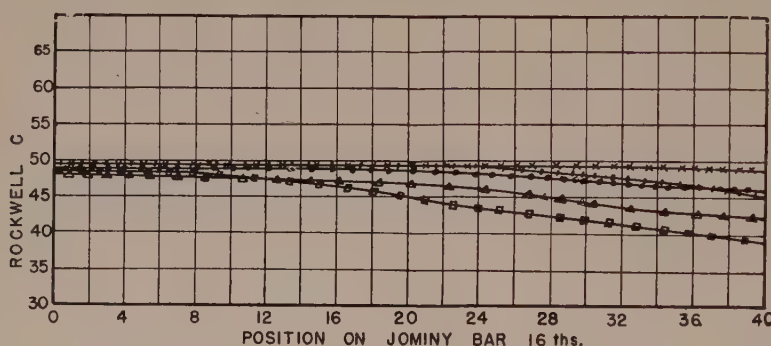
TABLE III
AWS-ASTM Specifications for Mild Steel Electrodes

Electrode Classification No.	Electrode Classifications			Mechanical Properties		
	Type of Electrode Coating	Capable of Producing Satisfactory Welds in Positions Shown	Type of Current to Be Used	Tensile Strength, min. Psi	Yield Point, min. Psi	Elongation in 2 in., min. Pct
E4510	Sulcoated or light coated	F, V, OH, H	Not specified, but generally dc, straight polarity (electrode negative)	45,000	not specified	5
E4520	Sulcoated or light coated	H-Fillets, F	Not specified, but generally dc, straight polarity (electrode negative)	45,000	not specified	5
E6010	High cellulose sodium	F, V, OH, H	Dc, reversed polarity (electrode positive) only	62,000	52,000	22
E6011	High cellulose potassium	F, V, OH, H	Ac or dc, reversed polarity (electrode positive)	62,000	52,000	22
E6012	High titania sodium	F, OH, V, H	Dc, straight polarity (electrode negative) or ac	68,000	55,000	17
E6013	High titania potassium	F, V, OH, H	Ac or dc, straight polarity (electrode negative)	68,000	55,000	17
E6015	Low hydrogen sodium	F, V, OH, H	Dc, reversed polarity (electrode positive) only	68,000	55,000	22
E6016	Low hydrogen potassium	F, V, OH, H	Ac or dc, reversed polarity (electrode positive)	68,000	55,000	22
E6020	High iron oxide	H-Fillets, F	Dc straight polarity (electrode negative) or ac for horizontal-fillet welds: Dc, either polarity, or ac for flat-position welding	62,000 62,000	52,000 52,000	25 25
E6030	High iron oxide	F	Dc, either polarity, or ac			

Types of Welds: F = Flat. H = Horizontal. H-Fillets = Horizontal Fillets. V = Vertical. OH = Overhead.

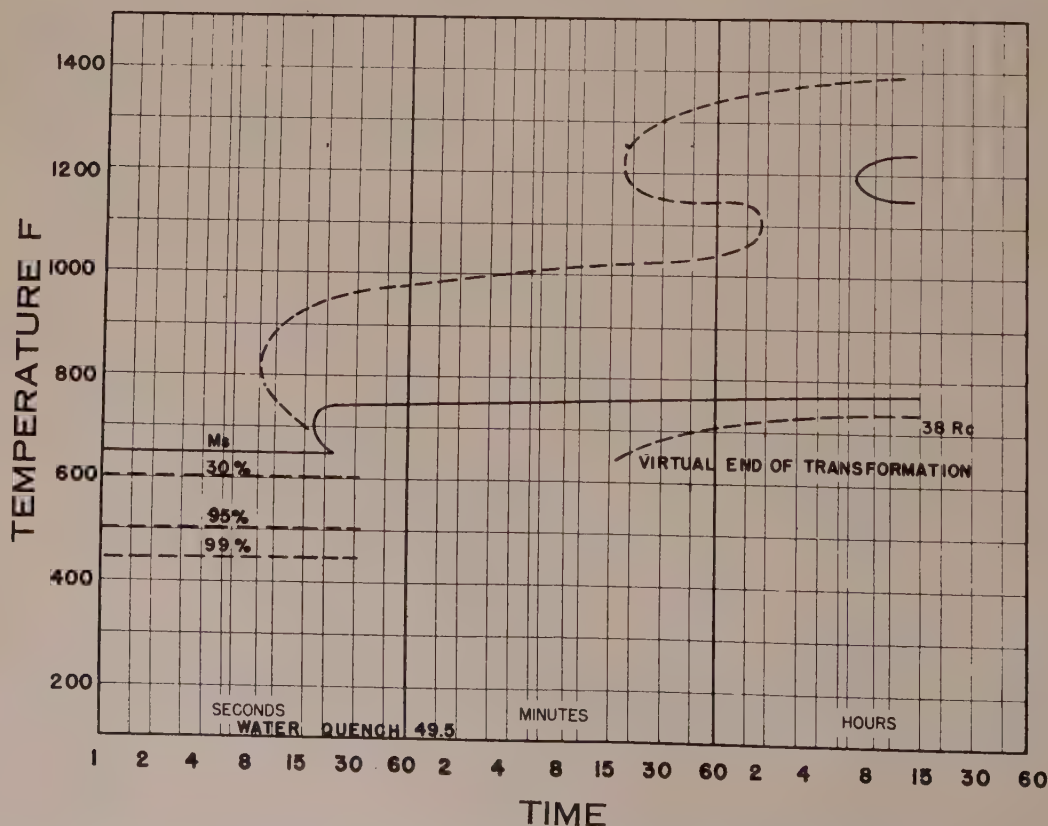
New Steel Features High

Possessing better notch impact resistance than conventional construction steels when heat treated to the same high tensile strength, HY-Tuf, a new steel, also has less sensitivity than conventional steels to notch effects both in static tensile and in rotating beam fatigue tests. In this concluding part of a two-part article, the hardenability of the new steel is discussed and data are given on the properties of the steel treated in sections up to 4 in. round. A comprehensive study of the microstructures of the steel in the hardened and annealed conditions is also presented.



LEFT
FIG. 12—Characteristic Jominy curves for five heats of HY-Tuf austenitized at 1600°F.

BELOW
FIG. 13—TTT curve of HY-Tuf. Austenitized at 1575°F; A_{c1} temperature 1300°F; prior condition-annealed.



Strength and High Toughness

By PETER PAYSON and A. E. NEHRENBURG
Assistant Director of Research and Supervisor
Research Laboratory, respectively,
Crucible Steel Co. of America
Harrison, N. J.

IT can be judged readily from an inspection of its composition that HY-Tuf is of high hardenability. Jominy curves of most heats of this steel show practically a horizontal line at a level of 48 to 49 Rc out to about the 32-16ths position. A few heats show somewhat lower hardness levels beyond the 16-16ths position but even the lowest hardenability heat has a hardness over 40 Rc at the 32-16ths position on the Jominy bar. Some characteristic Jominy curves are shown in fig. 12.

The transformation diagram, shown in fig. 13, indicates that not only is the pearlite* reaction appreciably retarded in this steel but even the high temperature separation of ferrite is very sluggish in spite of the low car-

* Actually the transformation product is spheroidite rather than pearlite.

bon content of the steel. The acicular ferrite, or intermediate product, reaction sets in quite rapidly at temperatures between 800° and 1000°F but the progress of this reaction is slow and

therefore in a continuous cooling hardening treatment very little of this product would form except with relatively slow rates of cooling. The bainite reaction proceeds fairly rapidly below about 700°F and the reaction is practically complete at 700°F in about 45 min. The martensite transformation starts at about 640°F and, so far as can be judged by metallographic examination, is completed by the time the steel cools to about 400°F. The bainite reaction follows rapidly after the martensite reaction at temperatures between 500° and 600°F, and pieces cooled at an intermediate rate, say that equivalent to the 32-16th position on the Jominy bar, would therefore have a mixed structure of martensite and bainite.

Some of the more significant transformation products formed in this steel during isothermal transformation are shown in fig. 14, and those formed during continuous cooling, that is, at various positions along the Jominy bar, are shown in fig. 15.

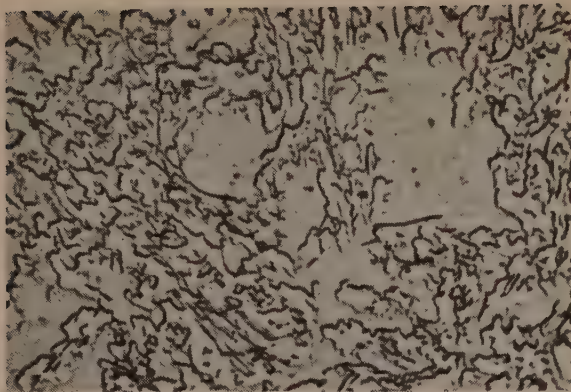
The effect of these transformation products on the mechanical properties of the steel can be

TABLE VIII
Effect of Size of Heat-Treated Section on Mechanical Properties of HY-Tuf

Heat	Size Treated, In.	Tensile Strength, Psi	0.2 Pct Yield Strength, Psi	Elong. in 2 in., Pct	Red. Area Pct	Izod Ft-lb at 70° F	Hardness, Rc
5184	1/2	235,000	193,000	12.8	48.3	30-31	47.5
	2	239,000	196,000	13.4	50.0	25-27	48
	4	242,000	195,000	10.9	38.2	20-24	48.5
	4 (outside)	234,000	193,000	10.9	39.7	20-29	48.5
5283	1/2	235,000	193,000	12.8	47.2	35-36	47.5
	2	238,000	196,000	13.1	46.6	34-35	48.5
	4	199,000	167,000	11.3	42.1	21-27	43.5
	4 (outside)	230,000	188,000	13.3	47.8	27-30	48
5308	1/2	235,000	193,000	13.1	46.6	25-25	47.5
	1	235,000	193,000	15.6	53.3	46-48	42
	4	188,000	146,000	16.3	50.4	40-45	38
	4 (outside)	173,000	138,000				

Heat	C	Mn	Si	Ni	Cr	Mo	Rockwell C on Jominy at Indicated Positions		
							32	40	48
5184	0.24	1.44	1.52	1.80	0.31	0.43	49	48	47.5
5283	0.25	1.42	1.52	1.80	0.23	0.45	48.5	48	48
5308	0.25	1.28	1.56	2.00	0.11	0.45	48	46.5	44.5

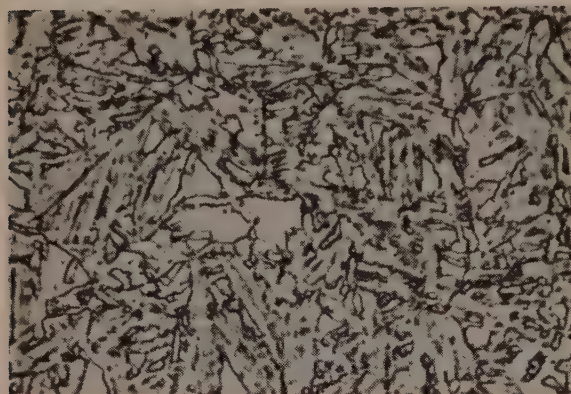
Annealed bars of the indicated size were austenitized at 1600° F, oil quenched, and tempered 2 hr at 550° F. Properties shown are for the center of the section unless otherwise noted.



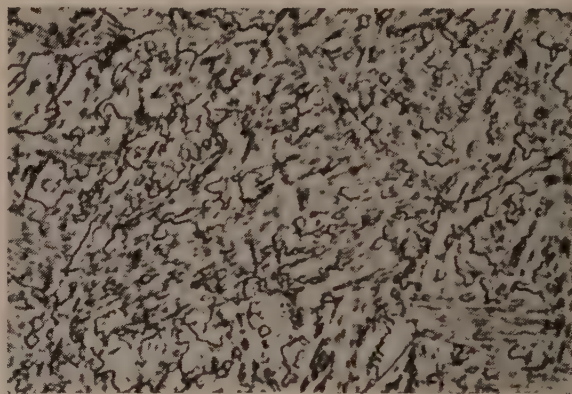
A



B



C



D

FIG. 14—Transformation products in HY-Tuf austenitized at 1575°F. (A) Acicular ferrite intermediate product, formed in 20 min at 800°F; (B) start of bainite, 1 min at 700°F;

(C) growth of bainite in 5 min at 700°F; (D) almost complete formation of bainite in 20 min at 700°F. Zephiran chloride—picral etch. 1000X.

judged best by tests on bars heat treated in various sections. Such data are shown in table VIII, for three heats of the new steel which vary somewhat in hardenability.

It will be noted that although the cooling rate

In the first part of this article, The Iron Age, Oct. 21, 1948, the authors compared this new steel with conventional construction steels from the standpoint of notch impact, notch tensile and notch fatigue properties.—Ed.

at the center of a 4-in. section quenched in oil is supposed to be equivalent to the rate which exists at about the 32-16ths position on the Jominy bar, there is a lack of correlation between the Jominy data and the actual hardnesses found in the 4-in. sections tested. This is in agreement with observations of Manning and others.¹³

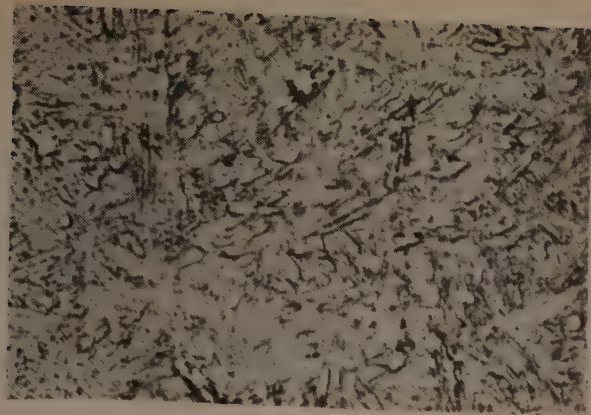
The 4-in. sections of the higher hardenability heats have lower ductility and impact values than

TABLE IX
Mechanical Properties of HY-Tuf As Air Hardened in 1/2-in. and 1-in. Sections

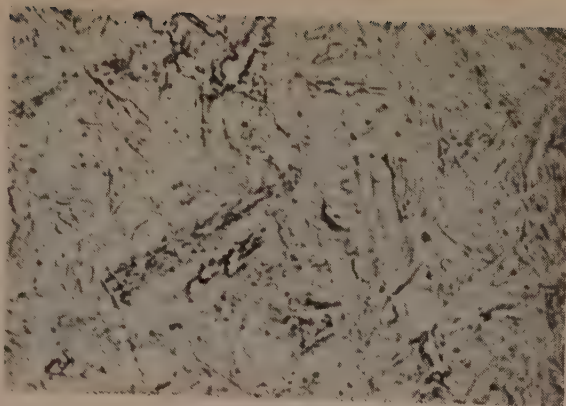
Size Treated, In.	Heat	Treatment	Tensile Strength, Psi	0.2 Pct Yield Strength, Psi	El. in 2 in., Pct	Red. Area, Pct	Izod Ft-lb at 70° F	Hardness, Rc
1/2	5271	1600° F, air	186,000	112,000	16.8	48.6	39-39	41
1/2	5271	1600° F, air	167,000	108,000	19.4	51.4	38-41	37
1/2	5308	1600° F, air	192,000	118,000	17.4	49.7	38-41	40.5
1/2	5308	1600° F, air	148,000	123,000	19.8	54.4	55-56	33
1	5308	temper 1100° F—1 hr	174,000	115,000	18.3	48.6	39-42	38.5
1	5308	1600° F, air	148,000	115,000	19.0	52.0	33-36	32
		temper 1100° F—1 hr						

Note—These heats had following Jominy values:

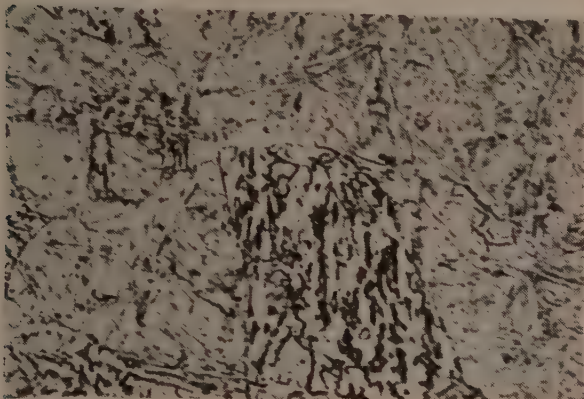
Heat	Rockwell C Hardness		
	32-16ths	40-16ths	48-16ths
5271	48	46	45
5308	48	48.5	44.5



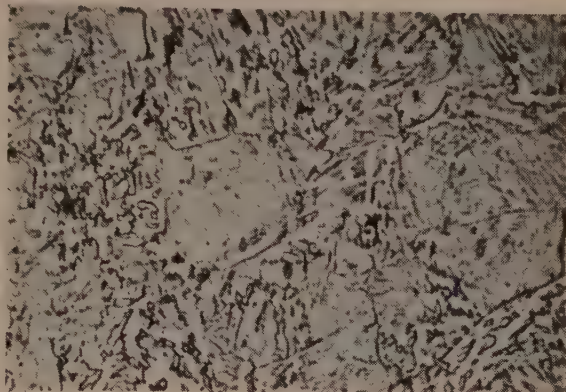
A



B



C



D

FIG. 15—Transformation products in HY-Tuf in continuous cooling hardening reactions. (A) Slight amounts of acicular ferrite, hardness Rc 48-49, 8 to 16-16ths on Jominy; (B) larger amounts of acicular ferrite, hardness Rc 47-48, 16 to

24-16ths on Jominy; (C) acicular ferrite and bainite, hardness Rc 46-47, 18 to 32-16ths on Jominy; (D) larger amounts of bainite, hardness Rc 43-45, 24 to 48-16ths on Jominy. Zephiran chloride—picral etch. 1000X.

the 1/2-in. sections of the same heats, but the Izod values are still over 20 ft-lb in the 4-in. sections. In the lower hardenability heat, the 4-in. section has excellent ductility and notch-impact resistance, but the tensile and yield values are about 50,000 psi below the values obtained with the 1/2-in. section of the same heat. The differences in structure at the centers of the 4-in. sections of the high and low hardenability heats of HY-Tuf may be seen in fig. 16. Evidently, the higher temperature bainite formed at the center of the 4-in. section of the lower hardenability heat causes the strength of the steel to decrease but improves the ductility and toughness.

To get additional data on the mechanical properties of the intermediate products, bars of 1/2 in. and 1 in. section were tested as air cooled from 1600°F. The results are given in table IX.

The intermediate products found in the steel, as air hardened in sections up to 1 in., have good ductility and notch-impact resistance, but relatively low yield strength. The ratio of yield to tensile in the air hardened steel is appreciably improved by tempering, and after an 1100°F temper the air hardened steel has properties almost as good as those of oil quenched low alloy steels tempered to the same tensile strength. This indicates that the intermediate products of HY-Tuf, when tempered to about 32 Rc have properties almost equal to those of low alloy steel martensite tempered to the same hardness. The steel

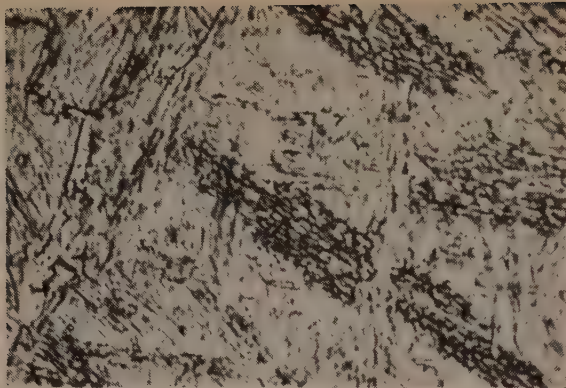
therefore may be expected to have good mechanical properties when treated in large sections by an oil quench and temper to a tensile of about 150,000 psi.

Weldability: In spite of its excellent hardenability the new steel has good weldability. Although in the drastic Battelle underbead cracking test¹⁴ it was found to be more susceptible to cracking than the much lower hardenability steels, 4130 and 8630, it was found to be definitely superior in this respect to 4340, a steel of similar hardenability but of higher attainable hardness.

Comparative data on this cracking sensitivity (reported in a private communication from the Metals Research and Development Group, Engineering Laboratories of the Glenn L. Martin Co. and presented with their permission) are given in table X.

The new steel has been reported by several prominent manufacturers of aircraft and aircraft engines to be quite satisfactory for flash welding. Arc welding with lime-ferritic coated rods of the same composition is quite feasible, the stringbead method being preferred to the weaving method for laying down the weld deposit. X-ray examination of a number of arc welded 1/4-in. plates showed these to be free from cracks even when the plates were welded at room temperature.

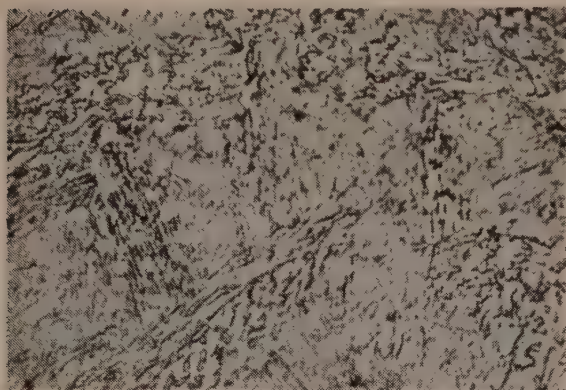
The properties of annealed plate stock, welded and then oil quenched and tempered; and of



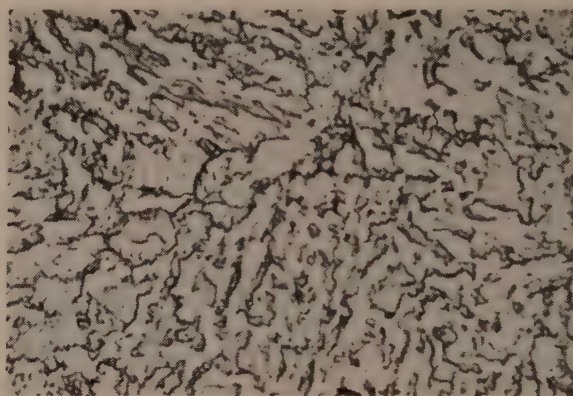
A



B



C



D

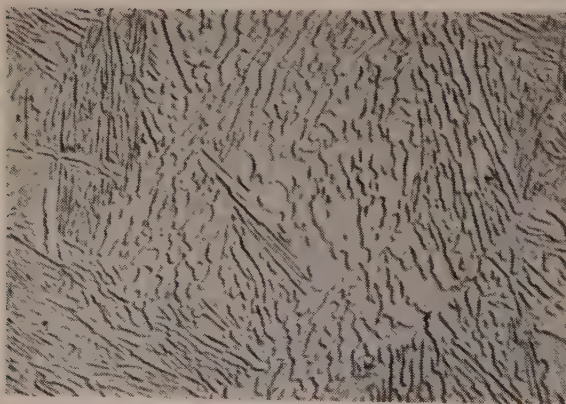
FIG. 16—Differences in microstructures at centers of 4 in. sections of HY-Tuf of different hardenability. Quenched in oil from 1600°F and tempered at 550°F. As-quenched structures (A) Martensite and bainite; (B) predominantly

bainite, some martensite; (C) martensite and bainite; (D) higher temperature bainite. (A) and (B) represent higher hardenability heat 5283, and (C) and (D) represent lower hardenability heat 5308. Zephiran chloride—picral etch. 1000X.

quenched and tempered plate stock, welded, and postheated at 550°F; are given in table XI. The heat treated weld metal showed good strength, fair ductility, and good notch impact resistance. The weld metal as deposited also was stronger and tougher than the heat affected zone in the plate which was heat treated prior to welding.

Carburizing: For some applications, the max-

imum attainable hardness of HY-Tuf is inadequate. Carburizing and cyaniding procedures for this steel were therefore studied thoroughly and it was concluded that although it was feasible to cyanide the steel, it was not practical to carburize it. Because of the high silicon and nickel contents, the rate of carburizing is slower than in commercial carburizing steels. Furthermore, once the steel is carburized, the high carbon case tends



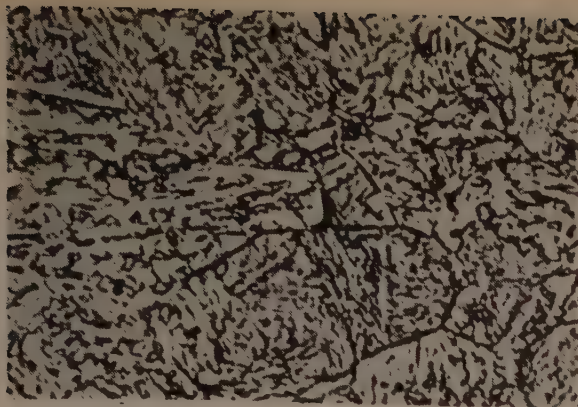
A



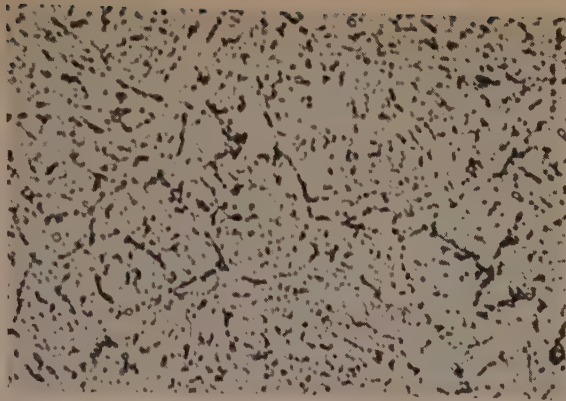
B

FIG. 18—Mixture of ferrite and austenite (martensite) in HY-Tuf heated to temperatures between A_1 and A_3 . (A)

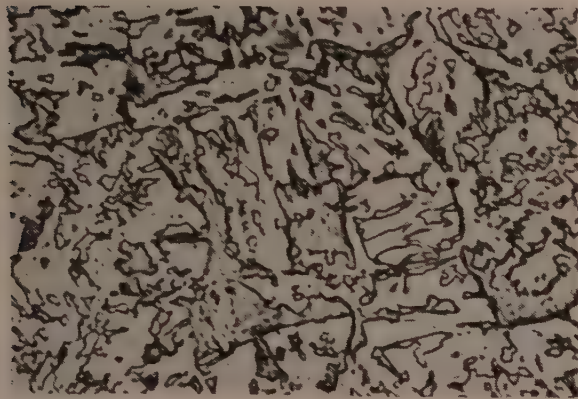
heated at 1360°F for 1 hr, quenched in water, 42.5 Rc; (B) heated at 1400°F for 1 hr, quenched in water, 44.5 Rc; (C)



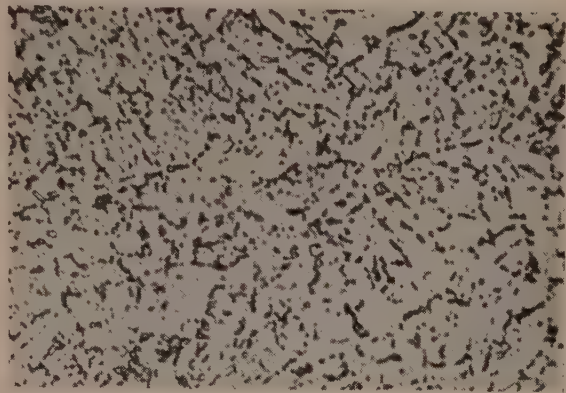
A



B



C



D

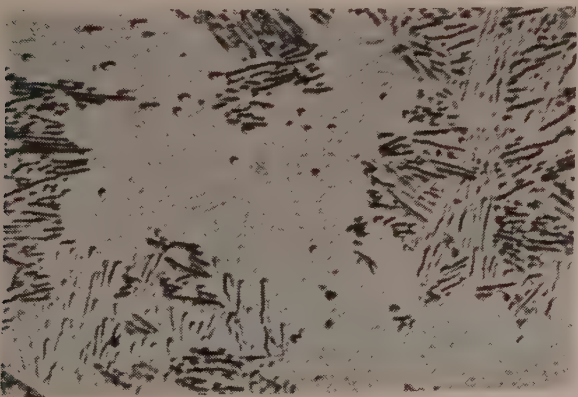
FIG. 17—Annealing of HY-Tuf by subcritical heating. (A) Heat 5731, as rolled, 38.5 Rc; (B) same as (A) after 1200°F for 16 hr, air cool, 24.5 Rc; (C) heat 5733, as rolled,

32.5 Rc; (D) same as (C) after 1200°F for 16 hr air cool, 21.5 Rc. Zephiran chloride—picral etch. 1000X.

to retain appreciable amounts of austenite if it is quenched from temperatures over about 1450°F. If the austenitizing temperature after carburizing is limited to 1450°F, the core of the carburized section has relatively poor ductility and notch impact, when compared with the properties of the core of commercial carburizing steels, although its hardness is appreciably higher than that of the commercial carburizing steels. For that reason, unless a very hard core is required, there is no reason for using HY-Tuf in preference to usual carburizing steels. On the other hand,

when a case of only a few thousandths thickness is required, heating in a commercial cyanide bath at 1600°F for 30 to 60 min followed by an oil quench gives the new steel a case of about 0.007 to 0.009 in. depth with a surface hardness of 57 to 62 Rc and a core hardness of 48 Rc.

Annealing: One final characteristic of HY-Tuf remains to be discussed, and that is its response to annealing treatments. For many machining operations a simple temper of the as-rolled or as-forged steel may be satisfactory. The hardnesses attainable by a heating of the as-forged steel at 1200° to 1250°F for 4 to 16 hr followed by an air cool are 223 to 255 Brinell and the structure developed by this simple treatment is shown in fig. 17, together with the structure of the as-



C

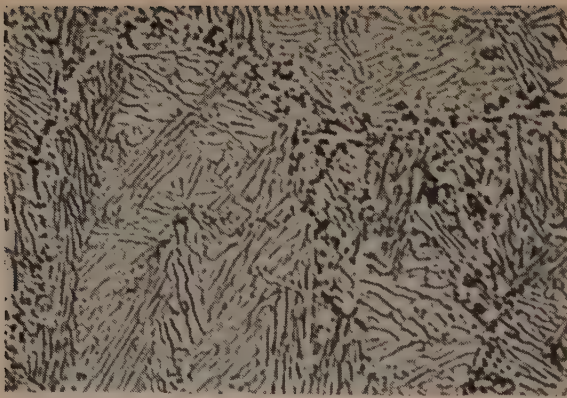
heated at 1450°F, quenched in water, 48 Rc. Zephiran chloride—picral etch. 1000X.

TABLE X

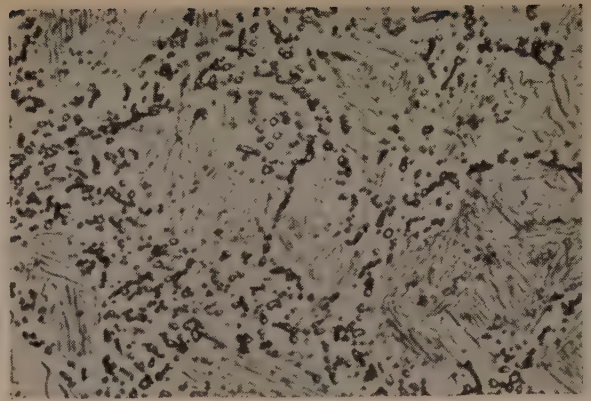
Comparative Crack Sensitivity of Aircraft Steels in Circular Bead Weld Tests, Battelle Method¹⁴

Steel	Average Cracking, Degrees
4130	15
8630	81
HY-Tuf	177
8740	239
4340	355

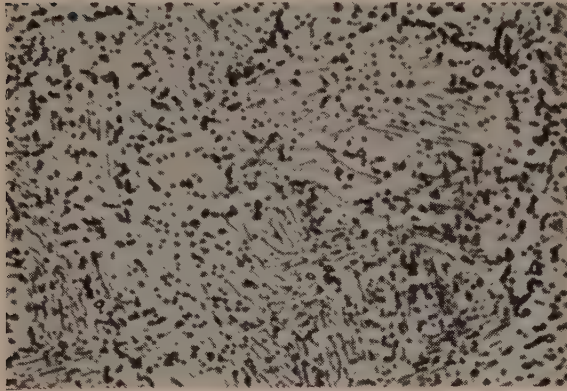
Five or six tests made on one heat of each steel. Data reported by Glenn L. Martin Co.



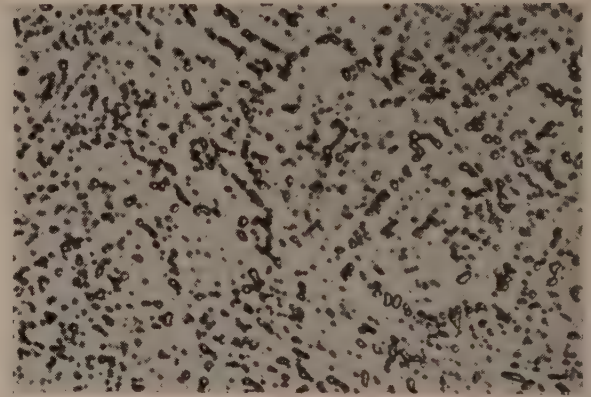
A



B



C



D

FIG. 19—Progress of transformation at 1200°F in HY-Tuf austenitized at 1350°F. (A) After 4 hr, quenched sample Rc 30; (B) after 8 hr, quenched sample Rc 24.5; (C) after

16 hr, quenched sample Rc 18; (D) after 48 hr, quenched sample Rc 16. Zephiran chloride—picral etch. 1000X.

rolled steel. It is important to remember in connection with the subcritical anneal that although the A_1 temperature is about 1300°F when the steel is in the fully annealed condition, very small

areas of austenite form in the as-rolled or as-forged steel if it is heated at temperatures as low as 1250°F, and it is therefore desirable to consider 1250°F as the maximum temperature for subcritical annealing.

To get very low hardness, it is necessary to heat HY-Tuf over the A_1 temperature and cool it so that high temperature transformation products are formed. In this type of annealing, trouble is likely to be encountered unless temperatures and transformation times are carefully controlled.

An unusual structure** is found in HY-Tuf when it is heated between the A_1 and A_3 temperatures, the latter of which is about 1550°F. This is illustrated in fig. 18. This lamellar orientation of ferrite and austenite in the partially austenitized steel is quite different in origin from

**** A similar structure has also been found in other alloy hypoeutectoid steels, including 4340 and 6140 when they are quenched from a temperature about half-way between A_1 and A_3 . However, so far as is known, this structure has as yet not been reported in the literature.**

that discussed by Roberts and Mehl¹⁵ and Digges and Rosenberg¹⁶ in that no prior pearlitic structure is involved. In HY-Tuf this lamellar mixture of ferrite and austenite is found when the steel is heated between the A_1 and A_3 temperatures, even when the prior structure is martensite produced by a water quench of a small section from 1900°F. This structure undoubtedly reflects

(CONTINUED ON PAGE 152)

TABLE XI

Mechanical properties of arc welded HY-Tuf. Plates, 1/4 in. thick, both in the annealed, and in the quenched and tempered, condition were butt-welded with filler rods of the same analysis with a lime-ferritic coating. The plates were preheated at about 400°F, and were postheated at 550°F for 2 hr. The weld beads were ground flush with the plate for the mechanical tests.

	Annealed Plate Welded, then quenched from 1600° F in oil and tempered 2 hr at 550° F	Hardened and Tempered Plate Welded, then postheated at 550° F for 2 hr
Tensile strength, Psi	220,000*	177,000*
0.2 Pct yield strength, Psi	179,000	153,000
Pct elong, in 1 1/2 in. (4.5√A)	7.6	5.7
Pct red. area	27	20
Hardness weld metal, max, Rc	45.5	43
Hardness heat affected zone, Rc		33
Hardness base metal, Rc	47	47
Reduced size Charpy** Ft-lb:		
weld metal	10-10-11	11-12-12
Heat affected zone		9- 9-10
Base metal	5-6	6- 6- 7
Bend test, degrees	110-120	65-75

* Annealed plate quenched and tempered after welding broke through weld metal. Hardened plate welded and postheated broke in heat-affected zone.

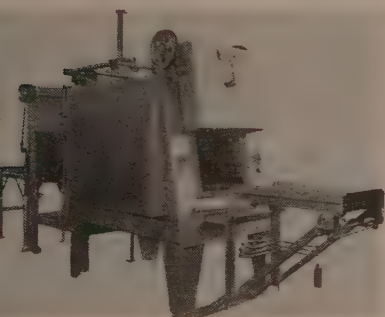
** Charpy pieces were 0.197 in. wide x plate thickness, the area back of the Keyhole notch being 0.197 x 0.197 in. Specimens of the same size were made from the annealed plate stock and had impact values of 9-10-10 ft-lb.

New Production Ideas . . .

New and improved equipment featured this week includes: A controlled atmosphere furnace, a coolant transfer pump, single cutter thread milling machines, cabinet forming machinery, a contour milling machine, a finishing lathe, a production machine for drilling holes from underneath, a mechanical separator, an industrial heater, and lubricant for open gears.

Atmosphere Furnace

A NEW model, all-purpose controlled atmosphere furnace suitable for hardening high speed and air hardening steels and for brazing and sintering, is heated by gas or oil-bar elements, and is built to

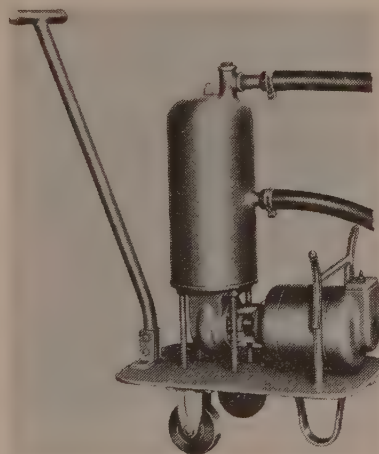


operate at temperatures up to 1600°F. Fast and uniform cooling is provided by a propeller type fan built into the top part of the cooling chamber. Protective atmosphere for the heating chamber and the cooling chamber is provided by a generator of the proper type for the work involved. Charge and discharge doors are operated by air cylinders. *Lindberg Engineering Co. For more information, check No. 1 on the postcard.*

Coolant Transfer Pump

THE portable Rumac repriming pump unit, Model R, has been designed for pumping coolants from reservoirs and for transferring liquids. The unit consists of a centrifugal pump having internal discharge features, installed in combination with a shell type reprime chamber with direct communicating discharge and inlet. This assembly is mounted on a fabricated steel truck having rub-

ber tired casters. The simple arrangement of the unit offers trouble-free economical performance plus positive repriming, it is reported. It requires a minimum of maintenance and is easy to operate. The unit is furnished with truck, pump Model 4C, reprime tank, two 10-ft lengths of hose including suction nozzle, and 40-ft electric cord with start-stop switch. Capacity of the unit is 40 gpm at 15 ft and 50 gpm at 3 ft differences in level

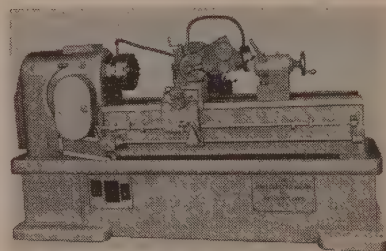


from suction nozzle to discharge level. The motor is 3/4 hp, 3450 rpm, available in standard voltages and current characteristics. *Ruthman Machinery Co. For more information, check No. 2 on the postcard.*

Thread Milling Machine

A SINGLE cutter type thread milling machine has been developed for the thread milling operation on long operating screws where threads are too long to be produced by the multiple thread milling cutter method. Work and cutter spindle are driven by individual two-speed motors. Cutter

speeds range up to 300 rpm when using high speed steel cutters, and up to 900 rpm when using carbide tipped cutters. With standard gears, U. S. form, Acme and worm threads from 1 to 20 per in. can be produced; and on diametral pitch worms, pitches from 7 to 20 can be cut. Leads from 1/2 to 3 in. are pos-

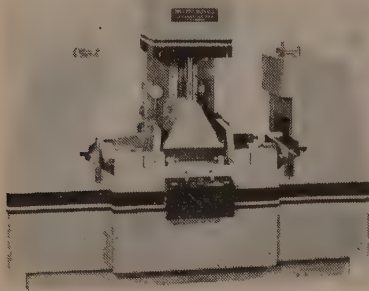


sible when cutting multiple threads. The machine has a capacity for swinging work of 10 in. diam over the cross slide or 16 in. over the ways of the bed. A 4-in. diam hole through the spindle allows the use of air operated collet chucks. The machine is produced in three bed lengths accommodating work between centers of 24, 42, and 60 in. *James Coulter Machine Co. For more information, check No. 3 on the postcard.*

Cabinet Forming Machine

THREE operations are performed as one, simultaneously, on the new automatic machine illustrated that performs three major bends in shaping complete tub sides and the back of a dish washing machine. The two outside heads contain forming slides that automatically and simultaneously form the curl and the reverse lip on the extreme ends of the part. These slides actuate hydraulically; retract automatically; and, through sequence control, the center forming

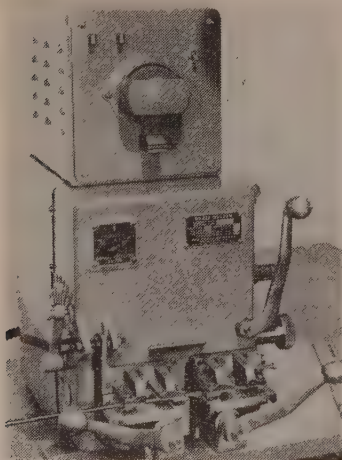
punch descends, making the two large radii bends with the assistance of wing type rocker plates. Controls are arranged so that the machine can run either automa-



ically or manually. Another similar machine forms the entire bottom of the dash washer in one operation instead of six operations previously required. Cold-rolled enameling steel of 18 and 20 gage is used. The machine turns out approximately 40 cabinets per hr. *Cyril Bath Co.* For more information, check No. 4 on the postcard.

Flash Welder

JOINING band saw blades up to 2 in. wide can be done with a new production flash welder that also joins wire, rods, bars, flat stock, up to 5/16 in. diam. The

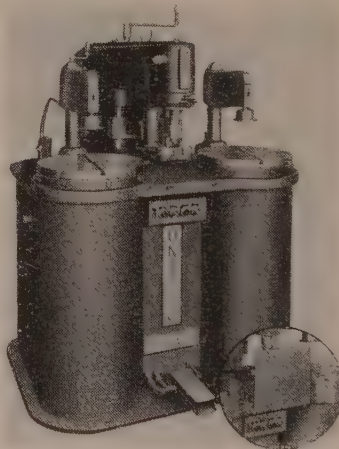


welder provides a complete welding service that includes not only welding but preparation of the material for welding, annealing and cleaning up the weld. The weld cycle is motor controlled and fully automatic. Dependable mechanical co-

ordination of welding heat and pressure assures perfect welds of uniform density and purity independent of the operator's experience. A grinding unit prepares material to be welded and grinds off flash after welding. A saw thickness gage is included for dressing the weld to proper thickness. A light-duty butt welder with capacity for welding saw blades up to 5/8 in. wide is also available for bench or pedestal mounting. *DoAll Co.* For more information, check No. 5 on the postcard.

Nonferrous Contour Milling

MASS production of round, rectangular, or irregularly contoured parts up to 18 in. diameter is a continuous operation with no interruption for work setup, on the new Onsrud A-18 rotary table contour milling machine. The unit is designed for milling aluminum and other nonferrous metals with similar cutting characteristics. Dual table construction permits one



to be loaded while work is being milled on the other. The second workpiece is loaded and ready at the completion of the first part with no time lost between machining cycles. As each milling operation is completed, the operator presses a pedal to automatically disengage the driving clutch for the rotating table, engage the clutch for the waiting table, and shift the cutting tool to the new work to start a new cycle. Cutter spindle operates at a speed of 11,500 rpm. Table rotation speeds are variable and may be adjusted while machine is in operation. *Onsrud Machine Works, Inc.* For more information, check No. 6 on the postcard.

Precision Shear

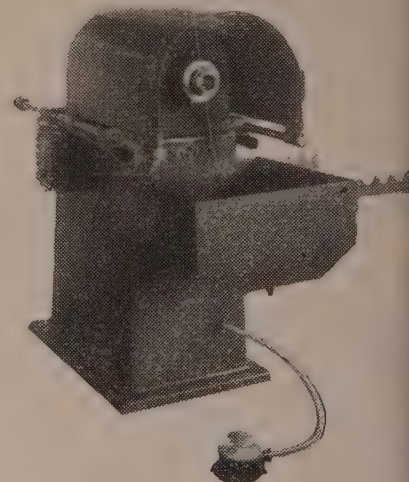
HAVING a 24-in. shearing width, a precision shear has been designed that cuts thin material as well as its maximum capacity in 16 gage steel. The rugged construction of the machine assures an accuracy in all duplicated parts.



Cuts are clean and free from rough edges or burrs. Adjustable stops provide positive control of the shearing action for slitting and notching to die accuracy. Shear blades are of tool steel. All four blade surfaces have a shearing edge, thereby offering quadruple service without resharpening. The Di-Acro Shear No. 4 is built by *O'Neil-Irwin Mfg. Co.* For more information, check No. 7 on the postcard.

Variable Speed Lathe

LARGE, round parts can be polished, deburred, or otherwise finished on a new variable speed lathe that holds parts on the



spindle by means of a chuck, face plate, or special fixture. The part is revolved during the finishing operation at the speed best suited to the part and the nature of the op-

ration. Spindle speeds, in a ratio of 6:1 from a low of 100 rpm to a high of 4800 rpm are obtainable when a single-speed motor is used. The ratio is 12:1 with a two-speed motor. The spindle speeds are controlled through a Reeves variable speed drive. A hood must be drawn forward over the work before the machine can be started, and control is provided by an electrically operated solenoid valve, actuated by a limit switch, which in turn, is operated by movement of the guard hood. A foot switch controls spindle starting and stopping. *Schauer Machine Co. For more information, check No. 8 on the postcard.*

Mechanical Separator

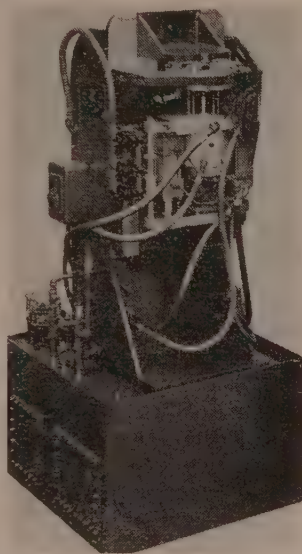
A MOTOR driven Roto-Finish separator for removing parts from chips or separating mixed chips into various sizes consists of a welded steel frame with an inclined surface on which is located a hoist pan serving as a hopper, and a waist-high separating table that supports a mechanized shaker screen assembly. The inclined surface for the hoist pan support is adjustable for correct gravity flow of parts and chips onto the screen.



The shaker screen assembly can be elevated from a horizontal to an inclined position with a height of 18 in. on the end nearest the hoist pan. This height plus the reciprocating motion provided by the motor drive separates parts from chips and automatically discharges parts at the opposite end. The stroke of the screen assembly is adjustable. The unit is powered by 1/4-hp motor. *Sturgis Products Co. For more information, check No. 9 on the postcard.*

Special Purpose Drill

DRILLING holes from underneath for the purpose of clearing out chips and increasing general overall production is possible with a recently designed special purpose drilling machine. The machine is composed of a standard Zagar gearless drill head, on each side of which are located two hydraulic cylinders acting as the feed mechanism for the head. There is fast approach to the drilling position, and rapid return. The drills are driven by a direct drive electric motor. The work holding fixture consists of an indexing mechanism,

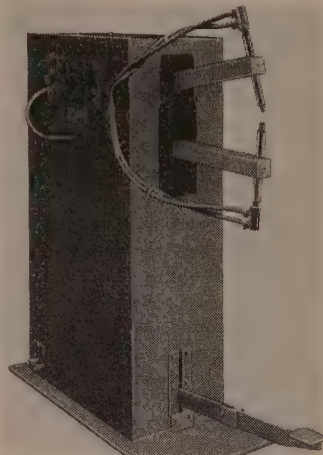


the parts being loaded on the top and indexed under a hard steel plate. It has a built-in lubricating system. Cycling is controlled with electrical limit switches and solenoid operated hydraulic valves. A welded steel base contains a hydraulic pump, an electric motor for driving the pump, and a chamber for the coolant. *Zagar Tool, Inc. For more information, check No. 10 on the postcard.*

Spot Welders

ELECTRO-WELD spot welders for fast, economical production are available in standard models and in special designs for particular applications. The model illustrated is a heavy-duty unit featuring 8-step current control permitting 75 pct secondary voltage adjustment. Electrode sizes are

standard, water cooled, and may be quickly renewed. Equipment features a spring-loaded foot switch, ample ventilation and arc welded



steel cases with removable top and rear door to facilitate inspection. Units operate on 220 v, 60 cycles, single phase ac. The welders are available with magnetic contactors and weld timers. *Electric-Arc Inc. For more information, check No. 11 on the postcard.*

Coolant

CHEM-CUT, a new metal cutting coolant, is said to increase production at lower cost. Chem-Cut is a water-soluble coolant applicable to jobs where water can be used. It contains no carbon tetrachloride, sulfur, or alcohol, and will not evaporate through circulation. This cutting oil requires no rust inhibitor or special mixing. *Warner Lewis Co. For more information, check No. 12 on the postcard.*

Electronic Recorder

THE Multi-Record Dynalog is a high-speed instrument, electronic in principle, making from one to six different records on one circular chart, the records being of colored dots so closely spaced as to make virtually continuous lines. The recorder has one measuring system, either resistance bulb or EMF type, but a positive-acting switching unit automatically brings the vari-colored pens into recording position at 6-sec intervals, in any sequence desired. Color-coding prevents possible mis-mating of circuits and pens. The record may

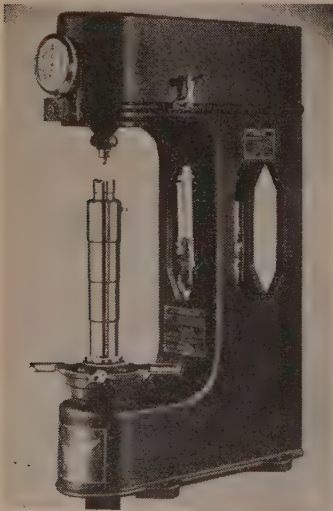
be used for measurement of temperature, pressure, humidity, liquid level, pH, conductivity, speed and other process variables. *Foxboro Co. For more information, check No. 13 on the postcard.*

Planer Tools

TOOLS of K1 Kennametal composition are capable of removing 3 to 4 cu ft of cast iron between regrinds when used in the newer types of planers having a clapper box lift. Six styles are available in various shank sizes. Style 11PH is recommended for vertical planing with the tool in a side head; Style 12PH, for horizontal planing with the tool in a rail head. Styles 9PH and 10PH are for straddle planing to square shoulders, or with lead angle. Styles 59PM and 60PM are for planing to sharp corners. *Kennametal, Inc. For more information, check No. 14 on the postcard.*

Hardness Tester

THE new and improved lightweight Clark hardness tester has a cast aluminum body. The tester is used for Rockwell testing metals and plastics. A frictionless spindle is said to assure a correct minor load. Other features include positive tripping for a more accurate major load; and the elevating screw is enclosed from top to



bottom, with the lower part serving as an oil reservoir. Three standard models are available with 8, 12, or 16-in. vertical capacity. *Clark Instrument, Inc. For more information, check No. 15 on the postcard.*

Industrial Heater

A NEW industrial warm air unit heater designed primarily for heating and ventilating can be used for process work and for make-up air applications. Fuel for this direct-fired heater can be oil, gas or coal. Capacities range from



300,000 to 2,000,000 Btu in the gas or oil-fired unit. Stoker fired, the capacity ranges from 500,000 to 2,000,000 Btu. The Central type heater can be used with stoker, heavy oil, gas or other type fuel, and is built in capacities from 2,500,000 to 6,000,000 Btu. Special features of the heater include four-pass gas travel, separate induced draft fan, and bearings on outside of the heater for easy maintenance. *Arthur A. Olson & Co. For more information, check No. 16 on the postcard.*

Feed Finger Pads

A LINE of cemented carbide feed finger pads has been made for use in master feed fingers of Brown & Sharpe, Hardinge, and Davenport automatic screw machines. The pads have high wear-resistance and are non-galling. They are said to assure positive feeding, do not mar the stock, and give long service. Pads range from 9/32 to 1 1/16 in. ID. *Kennametal Inc. For more information, check No. 17 on the postcard.*

Surface Finish Standards

TWO sets of surface finish standards are now available; a master set and a pocket set. The former consists of 23 stainless steel specimens each having a machine-cut surface of predetermined

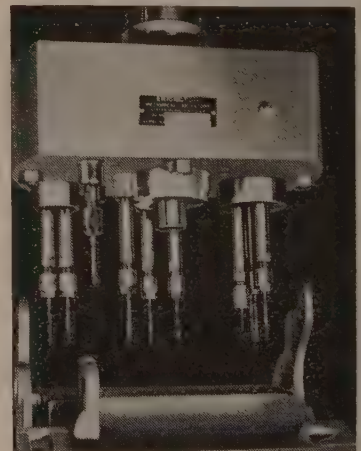
roughness value, ranging from 2 to 500 microinches. The roughness numbers follow the Preferred Number Series. Each specimen is removable from separate compartments in a serviceable box. The pocket set has 20 stainless steel specimens, having roughness values ranging from 2 to 500 microinches. Specimens are set in a folding magnesium-alloy case. Each specimen is plainly identified with its roughness value and the type of machining operation that produced it. *Edward Blake Co. For more information, check No. 18 on the postcard.*

Induction Motors

SILICONE resins for winding insulation and silicone grease for bearing lubrication make possible a totally-enclosed non-ventilated motor in a 5-hp, 4-pole rating in the same frame sizes as the open motor of the same rating. This permits reductions in frame sizes. Efficiency, power factor and torque are comparable to those for an open motor of the same rating. Weight is reduced to 145 lb, or is 60 pct of the Class A insulated motor. Height is reduced 3 1/2 in., length 7 1/4 in. *Westinghouse Electric Co. For more information, check No. 19 on the postcard.*

Drilling Head

ATEN spindle, multiple drilling head has been designed to drill ten hole sizes on different ele-



ventions. The head has grooved thrust ball bearings and hardened bronze radial bearings. Heat treated spindles and gears of one piece are turned from bar stock. It is

ared approximately 2:1. The unit enclosed in an aluminum case and ver. *Errington Mechanical Laboratory, Inc.* For more information, check No. 20 on the postcard.

ear Greasing

A NEW heavy lubricant for open gears under extreme service conditions and a new method application have been announced. Known as *Keystone Grease No. 32*, the lubricant is said to be equally effective through a wide range of temperatures, retaining plasticity, viscosity and density from below zero to its melting point which exceeds 400°F. The grease repels water to boiling temperatures and is packed in paper cartridges for use in gun applicators. Grease is fed through the nozzle in ribbon form and may be applied while gears are in motion. *Keystone Lubricating Co.* For more information, check No. 21 on the postcard.

Brass Cleaning

A NEW method for cleaning brass, copper and copper alloys prior to electroplating uses combined solutions of two new materials, *Oakite Composition No. 91* and *Composition No. 91-A*. Buffing compounds, cutting oils, forming oils and shop dirt contaminations can be readily removed. *Composition No. 91* is the basic cleaner, *No. 91-A* an additive. In both of these are incorporated wetting agents that are not broken down by the heat of the solution or the passage of current, plus special solvents and chelate-sequestering agents. These two-material solutions have high conductivity, remain free from surface scum and perform well with hard water, it is claimed. *Oakite Products, Inc.* For more information, check No. 22 on the postcard.

Stairway Lift

A TAIRLEVAYOR, an automatic stairway lift, is designed for material handling of loads over 1000 lb. from floor to floor. Installation is said to be simple and not expensive. Adjustable for width, length and pitch of stairway, it can be used as a lift over present wood or concrete stairways or in any open space, with or without steel tracks, inside or out. Push button controls are located at each floor

level. Special shaft space or reinforcement is not required. Safety factor is said to be 5 to 1, plus 45° angle stress to reduce load weight by one-half. The unit is available with or without steel stair treads and is furnished with motor, cables, automatic limit switch and electric brakes. *Moto-Flow Co.* For more information, check No. 23 on the postcard.

Vibratory Vertical Feeder

BULK materials can be elevated or lowered by a device utilizing controlled vibration to a spiral elevating ramp. High speed vibration causes the material to flow up or down the spiral ramp at rates controllable by a rheostat or reactor provided with each unit. There is no turning or rotating of the ramp.

Feeders are available in limited heights and diameters. *Syntron Co.* For more information, check No. 24 on the postcard.

Pocket Microscope

FOR shop, mill, laboratory and office use, a recently developed pocket microscope is said to be the equivalent of a standard laboratory microscope. It adjusts to 40X, 50X, and 60X. The unit, no larger than an ordinary fountain pen, draws out at the eyepiece end for power adjustment, carries hooded reflector and knurled collar for fine focusing at the object end. It features fully corrected achromatic objective, integral light reflecting mirror, and vernier focusing. Focal length is 20 mm. *Buhl Optical Co.* For more information, check No. 25 on the postcard.

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Calculator

DECIMAL-FRACTION calculator for use of engineers and calculators in adding and subtracting fractions and in converting fractions to decimals or vice-versa is offered. Wendt-Sonis Co. For more information, check No. 26 on the postcard.

Carbon Dioxide System

INFORMATION on a compact flexible carbon dioxide fire extinguishing system is given in booklet. Release mechanisms can be of automatic or manual types, and single or double row batteries of tanks can be used. American-LaFrance-Foamite Corp. For more information, check No. 27 on the postcard.

Shears

CATALOG S-5 describes all-steel shears for up to 1¼-in. thick, mild steel. Shears are equipped with ball bearing back gages and settings can be locked to 1/128 in. Cincinnati Shaper Co. For more information, check No. 28 on the postcard.

Cabinet Ovens

BULLETIN 8-S information on laboratory ovens, and standard and special cabinet ovens using electric, gas or steam heat. High capacity fans assure uniform temperature distribution in the ovens. Young Brothers Co. For more information, check No. 29 on the postcard.

Industrial Fans

BULLETIN 103 discusses low and high pressure industrial

fans with capacities up to 47,000 cfm free air. Cooling and exhaust systems, stack fans, duct boosters and related units are shown. International Engineering, Inc. For more information, check No. 30 on the postcard.

Metal Stitchers

METAL stitching machines for fastening metal to metal, or to plastics, canvas, cork or other materials, are described in bulletin. Machines will drive wire stitches through metals 0.060 in. thick, varying with the temper of the metal. Acme Steel Co. For more information, check No. 31 on the postcard.

Mobile Crane

MOBILE crane, mounted on 12 pneumatic-tired wheels and powered by a single engine, is described in bulletin. The crane, weighing 50,000 lb, is designed for both yard and highway operations. Unit Crane & Shovel Corp. For more information, check No. 32 on the postcard.

Drive Chains

CATALOG 808 gives information on drive chains in pitches ranging from 1½ to 6 in. and in straight and offset side bar types. Metal specifications and treatments for the chains, according to particular needs, are given. Jeffrey Mfg. Co. For more information, check No. 33 on the postcard.

Phosphor Bronze

PHYSICAL properties, chemical analyses, specifications and typical uses of phosphor bronze are given in booklet. Alloys are available in strip and sheet, spring wire, flat wire, wire rope, rod, ingot and other forms. Phosphor Bronze Corp. For more information, check No. 34 on the postcard.

Air-Cooled Engines

ENGINEERING and production of heavy-duty, air-cooled engines are discussed in booklet. Applications of the engines in farm service, construction work, mining, highway service and general industry are shown. Wisconsin Motor Corp. For more information, check No. 35 on the postcard.

THE IRON AGE, New York 17, N. Y.

10/28/48

2

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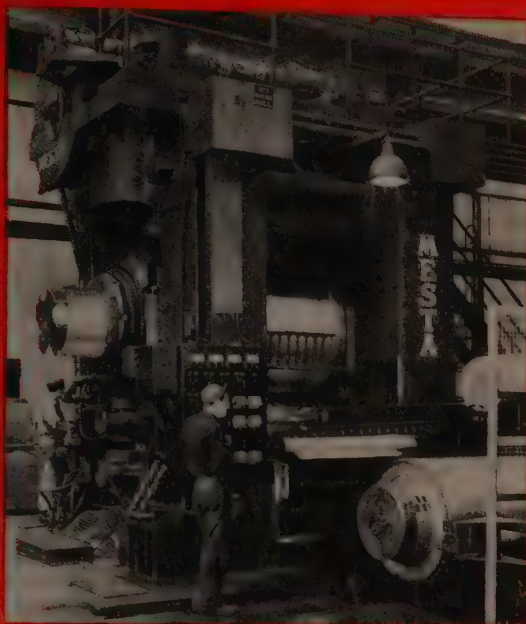
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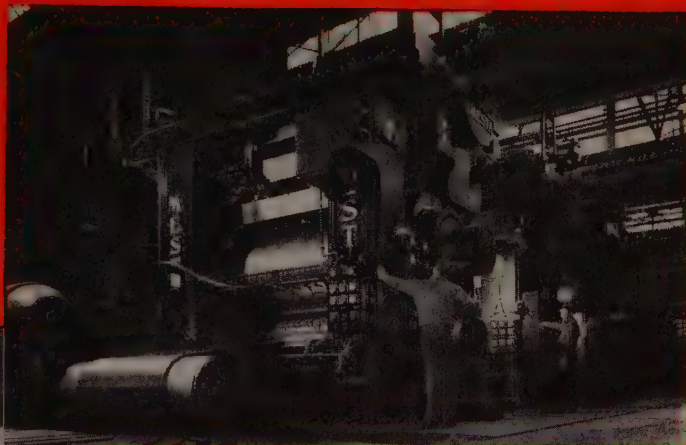
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WALTER G. PATTON

• Postwar Nash features all-enclosed wheels and coil springs all around... Ambassador weight reduced 90 lb. ... Buick plans to introduce new cars about Nov. 20.



KENOSHA, WIS.—The two completely new postwar cars introduced by Nash this week feature all-enclosed wheels, a silhouette 6 in. lower than the previous model, coiled springs on all four wheels, greater seating capacity and bumper-to-bumper streamlining. Instruments have been regrouped and mounted on the steering column. A shroud surrounds the instruments, shielding them from reflections from other cars and roadside signs. Nash engineers contend there is less diversion of the driver's attention where the instruments are concentrated in a group close to the normal line of vision.

Nash calls this new unit a "Uniscope." Instead of the usual 2 in. conventional steering column tube, a 4 in. column jacket is used. This conceals not only the customary steering shaft but also the gear shift rod, the speedometer cable and all the wiring leading to the Uniscope instruments.

The column jacket is built on a special merry-go-round assembly at Kenosha. Rubber is used extensively to isolate the column tube from other body members.

For the first time the Nash Ambassador has "Unitized frame-body construction." The change has resulted in a decrease of about 90 lb in weight. For example, the 4-door sedan 1949 model weighs approximately 3320 lb compared with 3412 for the 1948 4-door model.

The new "600" line 4-door sedan weighs 2905 lb compared with 2836 lb for the previous comparable model. Increased weight of the Nash 600 is attributed to the larger body (for which more steel is required) and a substantial increase in glass area.

The new models have a low, massive chrome-barred racing type air scoop.

The rear end design features a unique arrangement of trunk lid handle, tail, stop and directional signal lights located in a single chrome unit.

In the latest models, the battery has been moved under the hood to improve accessibility. Both the Ambassador and the 600 have torque tube drive.

Elimination of the usual fender cutout has been made possible by narrowing the front tread approximately $2\frac{3}{4}$ in. According to Nash engineers the front tread is of lesser importance than the rear tread as far as car stability, high speed cornering and general handling characteristics are concerned. (Two competitive cars use a narrower tread in the rear than in the front).

The wheelbase remains unchanged at 112 and 121 in. for the "600" and the Ambassador respectively. Overall length has been increased about an inch.

The front seat width has been increased about 6 in. as a result of the new styling. The floor is approximately $2\frac{1}{2}$ in. lower than the 1948 models and the roof is 6 in. lower. The seat-to-floor measurement is about 2 in. less than the predecessor models.

The one-piece curved windshield of the new cars has about 40 more sq in. of glass area than the 1948

Nash. The new windshield is installed from the outside to insure improved water tightness. About 11 pct more windshield area is swept by the new wiper blades.

The rear window has been widened to cut down blind spots at the rear corners. Height of the rear window remains the same as in the 1948 series.

The trunk compartment in the 1949 models has been rearranged to make the trunk space more usable. Approximately 24 cu ft of storage space is available with the spare tire in place.

STRUCTURALLY the new 1949 Nash bodies are about the same as the predecessor models. However, the front end of the car has been redesigned to better accommodate the new wheel position.

All doors are hinged at the front. The upper edge of the instrument panel is now called the "cockpit panel" because of the absence of the usual instruments. Incidentally, the new panel is clad plastic. All control knobs except those for the radio and heater have been removed from the instrument panel. The bumpers are wrap-around type. Brakes have been redesigned to operate with lower pedal pressure.

Several interesting changes have been made in the Nash powerplant. The diameter of the crank pins used in the "600" engine has been increased $7/32$ in. to $2/32$ in. This has increased the diameter of the connecting rod bearings. Since greater bearing area is not required, stiffer cheeks have been designed into the crankshaft, giving a crankshaft which is 25 pct stiffer. The crankshaft for the Nash 600 is 80 pct counterweighted compared with only 63 pct for the earlier models.

The Ambassador crankshaft is again 100 pct counterweighted, a total of eight counterweights being used compared with only four used previously. The Ambassador crankshaft is of the 7-bearing type—similar to the crankshaft used in

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Examples of how the Wheelabrator has attained its position of leadership are shown below. Let us show you how similar results can be obtained for you.

Half Hour Cleaning Time Cut to 5 Minutes

Prior to the installation of a 48" x 42" Wheelabrator Tumblast (17½ cu. ft. capacity) the Unit Drop Forge, Div. of Fuller Mfg. Company, Milwaukee, Wisconsin, used a combination of tumbling and pickling, both of which took about two hours to clean 2,000 connecting rods. The Wheelabrator now cleans 500 in five minutes' time, and is currently cleaning 3,000 per hour.

180 Cylinder Blocks Cleaned Hourly

The American Foundry Co., Indianapolis, Ind., uses a Wheelabrator Cabinet, with three Wheelabrator units, for cleaning 180 cylinder blocks hourly. With their former tumbling and airblast cleaning method, forty-five laborers were required for all cleaning operations. A labor force of only 31 men is now utilized in the cleaning room.

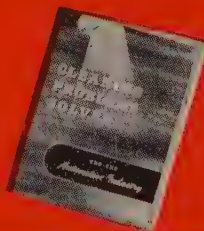
2½ Hour Cleaning Job Now Done in 20 Minutes

John Deere Tractor Co., Waterloo, Iowa, uses a 48" x 42" Wheelabrator Tumblast for cleaning various types of heat treated forgings such as gear blanks, piston rods, etc. Cleaning time averages 10 and 20 minutes per load. The former cleaning method consisted of tumbling them for an hour and a half and then recleaning them on an airblast table for another hour.

Production Increased 8 Times

A No. 1 Wheelabrator Multi-Table installed at Mechanics Universal Joint Co., Rockford, Ill., is doing a splendid job of cleaning bearing caps and spiders. The work now cleaned by Wheelabrating in one hour formerly took 8 hours to do in a Suction Blast Cabinet.

Write for your free copy of "Cleaning Problems Solved for the Automotive Industry". Ask for Bulletin No. 334.



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510 S. Byrkit St., Mishawaka 3, Indiana

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

the original Kettering high compression engine.

The "600" pistons have four rings instead of three.

A new developed water pump with "packless" type seal is used on both models. The seal is of the cartridge construction, and is installed and serviced as a unit.

A split-type hood is employed on the new models. The hoods are being assembled on a new merry-go-round at Kenosha.

Nash's "Weather Eye" has been redesigned to give greater heating effectiveness at low speed, better distribution of warm air in the passenger compartments and more effective water shedding. Heat transfer capacity of the new heater core is said to be increased 10 pct. The redesigned water shedder or separator at the air intake handles 15 pct more water. The new design handles anything short of a direct stream from a hose. The defroster fan now draws all its intake air from below the heater, adding to the total heated air delivered to the passenger compartment.

NASH has an entirely new arrangement of cushions for the bed. The bed can now be made up more easily and the trunk com-

partment and its contents need not be disturbed. Where a bed is specified in a 4-door sedan, the front seat will be divided type construction, so that each side can be unlatched independently. In the 1949 bed arrangement, there are no auxiliary cushions.

New Nash List Prices

• • • Prices of the 1949 Nash have been advanced \$275 on the Super 600 series and \$390 on the Ambassador series. These are average price increases that are effective Oct. 22.

The new factory list price for the Super 600 series 2-door sedan is \$1688; the Brougham, \$1710, and the 4-door sedan, \$1713.

The new Ambassador series 2-door sedan is priced at \$2109; the Brougham, \$2130 and the 4-door sedan \$2314.

Nash has adopted torque tube drive and coil spring suspension because of weight advantages and lower cost. It is pointed out, for example, that the weight of the leaf

springs is about four times that of coil springs (34 lb as against 9 lb for each unit). With the new suspension on both series a track bar is used at the rear to control axle-to-body relationship. Additional weight savings are accomplished by using an aluminum die cast inlet manifold cover on the Ambassador and on A1 clutch housing.

FLINT.—The new Buick, to be introduced about Nov. 20, was previewed by the Detroit press at Flint this week. Harlow H. Curtice, soon to move up as executive vice-president of General Motors, conducted the press conference.

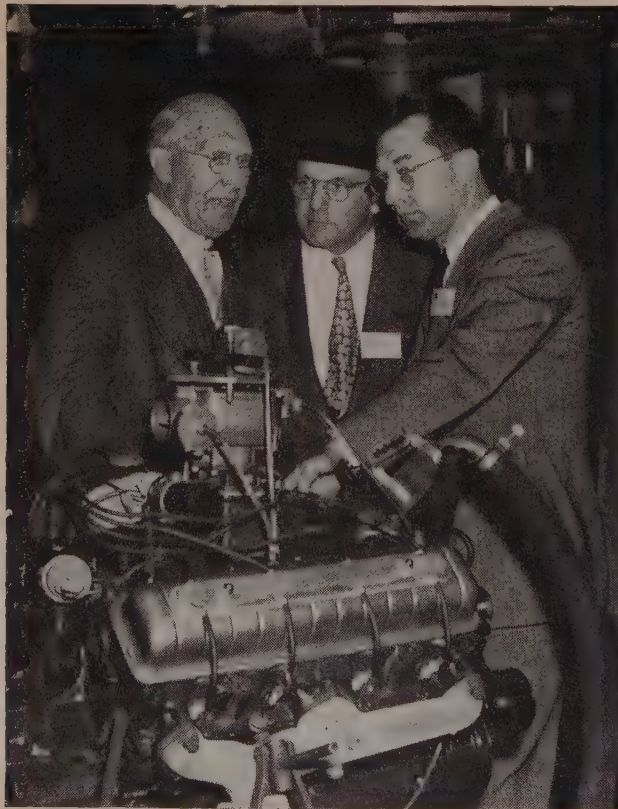
Mr. Curtice disclosed that the new models follow the current accepted trend of the industry—roomier, lower, wider and more glass. The Buick plant will remain closed for the next 10 days. Production of the new model starts Nov. 1.

Acceptance of Buick's new Dynaflow transmission is coming fast, Mr. Curtice disclosed. Current output of the Dynaflow, now averaging 450 units daily, is climbing steadily. Up to the present time Buick has produced a total of 50,426 Dynaflow transmissions. During the coming model year the Dynaflow will be standard equipment on the Series 70 Roadmaster models and optional equipment on the super series cars.

Mr. Curtice estimated Buick's 1948 output at 280,000 units, the third largest calendar year in Buick's history and 12,000 units more than last year. Sales of replacement parts, it was disclosed, are several times the prewar level.

Mr. Curtice did not disclose fully Buick's plans for the special series. For the moment, the Buick special remains unchanged. It is problematical how long production will continue. Some sources are estimating the new Special series will be introduced as early as next spring. It is known that some tools for the new models have already been purchased. However, the introduction date remains uncertain. Some sources believe the new model will not be introduced before mid-summer and may be even later than this.

Mr. Curtice disclosed that the greatly enlarged Buick plant is now capable of building 500,000 cars a year. Peak production since the war has been 70 pct of capacity.



BOSS KET'S NEW BABY: "Boss Ket," noted GM research engineer, talks about his new 135 hp high compression engine with S. E. Skinner, vice president of GM, and Marvin L. Kathe, superintendent of the new Kettering engine plant at Lansing. The new engine is 10 in. shorter than the 43 in. straight-8 and is expected to give at least one more mile per gal at a 7.25 to 1 compression ratio than the present engine.

Sunbeam STEWART WIDE RANGE OVEN

THE BEST INDUSTRIAL FURNACES MADE (OPERATING RANGE 300°-2400°F.)

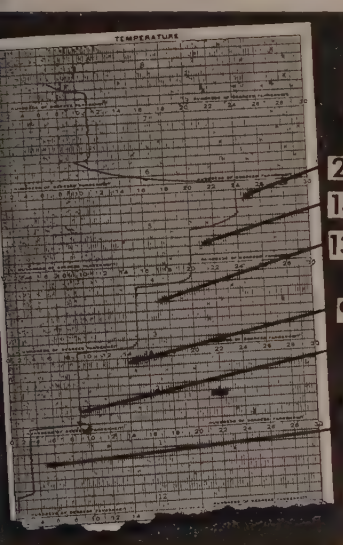
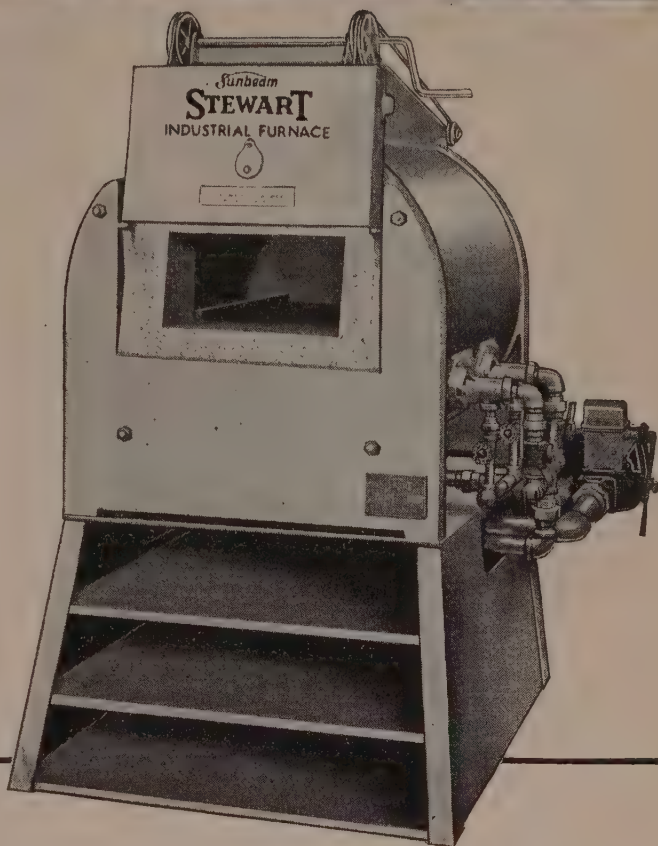
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IDEAL FOR SHOP OR GENERAL PLANT USE

Temperature chart at left shows why this Semi-muffle Oven answers the long felt need for a small furnace flexible and efficient for performing a variety of heat treating operations. 300° in 5 mins.—held 70 mins. 300 to 900° in 3 mins.—held 80 mins. 900 to 1500° in 7 mins.—held 60 mins. 1500 to 2000° in 13 mins.—held 50 mins. 2000 to 2400° in 12 mins.—held 40 mins. Returns from 2400 to 1100° in 20 mins.—held 80 mins.

Get information on this Sunbeam Stewart Oven today. Moderately priced, it may be just the furnace you need for the various heat treating jobs in your plant. Check your requirements on coupon below. We'll be glad to give you complete information at no obligation.

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Canada Factory: 321 Weston Rd. So., Toronto 9

• European industry nearly back to prewar production . . . Still far below current needs . . . Greater amounts of industrial materials to be authorized . . . Hoffman visions assembly line method.



WASHINGTON — Industrial production in Western Europe in general is back pretty close to prewar levels but it is still far short of meeting postwar requirements for either current consumption or rehabilitation. Moreover, there is little prospect that the Marshall Plan nations will have attained complete self-sufficiency, even by prewar standards, by the time the present 4-year aid program expires.

These conclusions are drawn from the Economic Cooperation Administration's first report to Congress. It covers the first 3 months of ECA operation.

Since a major portion of the time during this period had to be devoted to organization and setting up plans and policies, ECA progress cannot be measured by the figures for this period. Actually, total authorization amounted to only about \$650 million, not counting transportation costs. Also, a portion of this amount merely covered deliveries already made before the ECA became official.

In its separate, running report to the press, however, ECA shows that the program picked up considerable speed during the second 3 months of operation. The accumu-

lated totals through September amounted to nearly \$2 billion worth of authorizations and reimbursements.

This amount was slightly less than half of the money available for grants, aside from the \$1 billion authorized for repayable loans.

Approximately half the authorizations during the first 6 months of the program involved food, fertilizer and related agricultural commodities. While fuel, such as coal and oil, took more than a fourth of ECA allocations for the first 3 months, the ratio for the 6 month period has dropped to 17 pct; increased European coal production and foreign shipments of oil are largely responsible.

IN addition to the improved outlook for coal, the steel situation appears brighter to ECA than several months ago. Iron and steel authorizations as such have been relatively small. For instance, the first 3 months saw authorizations for only \$8.5 million worth of American-made ingots, plates and the like. Authorizations through September for all iron and steel products amount to \$39 million—of which \$29 million were for primary mill products and \$8 million for advanced manufactures, leaving less than \$2 million for procurement of finished iron and steel manufactures.

On the other hand, \$126 million in purchase authorizations were approved for ores, minerals, and nonmetallic metals. Machinery approvals amounted to \$85 million.

Despite some gloomy aspects, the ECA report generally carries an optimistic overtone. It sees European recovery in general as on the upgrade although a few nations are still laggards, notably Italy, Austria, Germany and Greece.

Individual signs of recovery are apparent throughout Western Europe. German steel production is at a higher rate than originally anticipated. Overall steel production in Western Europe is estimated at about 6 pct ahead of ECA's original schedule.

Another heartening sign is the agreement between the Western European nations allocating the recovery funds for the year ending June 30, 1949. ECA has been insistent that these nations divvy up the aid among themselves; it was felt that this would be a major step toward long-term inter-European cooperation.

THEN, too, ECA Administrator Paul Hoffman has predicted that the funds required for the second year of the program might be smaller than this year's \$5055 million.

With outright relief requirements demanding first and immediate attention, only about 20 pct of shipments approved so far have consisted of industrial materials both raw and partially fabricated. Now that this pressure is easing at least for the time being, officials expect to give more attention to the procurement of industrial goods.

Since any shipments of steel from this country at the moment act as a brake on American production, the ECA plans to keep such authorizations at the lowest minimum possible. On the other hand, the agency may be expected to approve greater purchases of mining and other industrial machinery with a view to stepping up foreign steel production.

The ECA also has been studying the reparations program insofar as it applies to the dismantling of plants and capital equipment in Germany. It has been digging into the background of the problem dating back to the agreements at Potsdam. Specific recommendations as to retention of certain plants will be urged.

With the emphasis turning more toward industrial materials, here again is the oft-repeated story of shortages. Not only is this serious overseas but also within the countries to which Western Europe looks for assistance. Foreign labor problems and lack of facilities are prevalent.

Shipments and authorizations of materials during the first 6 months



BEARING FAILURES DOWN...STEEL PRODUCTION UP

Sun Grease Increases Production by Cutting Bearing Failures 92%

Burned-out table roll bearings were causing loss of valuable production time in a steel mill. The failures— as many as five a week—were due to the grease melting and running out as a result of heat reflected from the steel plates. Each bearing replacement cost \$80, not counting labor cost.

A Sun Engineer who was called in recommended a high-melting-point grease that had proved its ability under similar conditions.

With this Sun lubricant on the job, 92 percent of the bearing failures have been eliminated. A cash saving of about \$18,000 a year has resulted, and additional

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have been channeled largely into the basic industries with the result that the recovery rate of industrial production has been greater than that of consumer goods. This is in line with the expressed intent of the Marshall Plan although some nations have been disappointed in not being allowed to spend the appropriations as they saw fit.

ADMINISTRATOR Paul G. Hoffman, however, has clung stubbornly to the belief that Europe's main salvation depends on self-help—that she must center attention on production of what he calls “multiplier” goods (those which are used to produce still other commodities).

His unbending attitude in this matter has also been made evident at home. This is indicated, for instance, in a recent statement that he would not authorize any ECA procurement which has for its primary purpose the creating or supporting American markets abroad.

This thinking is reflected at policy and planning levels of the organization. For the present, at least, ECA is concentrating on raising European production. The first step is to work for modernization of foreign factories. Future

authorizations may be expected to lean heavily toward purchases of new and more up-to-date equipment for replacement as well as repair requirements. This will be especially evident in those fields which produce manufacturing machinery.

Some progress has been made in providing production equipment without seriously affecting American supply. Lists of surplus machine tools and general industrial equipment which are generally in long supply and not needed for national defense have been made available to participating nations. These include lathes, drill presses, planers and other general purpose tools.

IN one instance, surplus coal mining machinery originally scheduled for shipment to Soviet Russia under lend-lease, was transferred to ECA nations instead.

The ECA also hopes to increase European production through more efficient management and higher labor productivity. The latter may prove the more difficult of the two problems. Some of the countries are suffering a lack of manpower, especially skilled workers but others have large unemployment.

Obviously, the answer to the manpower shortages is to increase worker productivity. This could be brought about by utilization of the American system of training programs. The great drawback is that it is difficult to convince the workers of those countries that use of better techniques and improved machinery will not displace many workers.

Another solution would be the employment of surplus labor of one country in others on a contract basis. This would involve, however, the difficulty of transferring large groups and working out labor standards and guarantees that they could return to their own country.

On the other hand, not too much difficulty is seen in inducing use of more efficient management methods and improved machinery by industry itself.

EVER since he first began visiting the Marshall Plan nations, introduction of American assembly line methods into European factories has been a pet ambition of Administrator Hoffman.

In his visits abroad, he has been quietly preaching his gospel. Realizing that foreign interests might well interpret such action as pressuring, Mr. Hoffman has refrained from making outright recommendations that they do this. Instead, he has thrown out frequent and repeated hints that American experts would be glad to help them plan new methods and advanced techniques—if invitations to do so were extended.

This labor is already beginning to bear fruit in the recent creation of the Anglo-American Council on Productivity. This group consists of six each of British industry and labor representatives and four each of American industry and labor. Its purpose is the exchange of ideas and information on how British production can be increased. The first meeting will be held in London in late October.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Completing Repairs

Boston

••• On or about Nov. 1, workmen will have completed repairs on the blast furnace of the Mystic Iron Works, officials of the company have announced. The furnace has been out of operation since early July.

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***SALES APPEAL**—the qualities of a salable product, especially its appearance, performance, and durability, which cause it to be selected by the buyer.



Advance

PAINT COMPANY
INDIANAPOLIS, INDIANA

• As new president of Columbia Steel, Alden Roach will be vigorous and popular . . . Changed public relations policy of U. S. Steel evident in Pittsburgh plant dedication ceremonies.



SAN FRANCISCO—As 325,000 tons of cold-rolled sheets and tinplate were added to the annual finished steel facilities of the far West with the formal dedication of the new modern continuous mill at Pittsburg, Calif., Oct. 21, Columbia Steel Co. welcomed a new president in the able, vigorous and capacity-proved person of Alden G. Roach.

At a press conference following the elaborate plant tour, luncheon dedication ceremonies, attended by



Alden G. Roach

some 2300 financial, business, industrial and political leaders of the West Coast, president Benjamin F. Fairless of the parent U. S. Steel Corp., formally announced that effective Nov. 15, Mr. Roach, now president of Consolidated Western Steel Corp. of Los Angeles, will succeed J. Lester Perry, former president of Carnegie Illinois Steel Corp., who had been called back

from retirement on May 1, 1947, to assume the presidency of Columbia following the sudden death of William A. Ross. Mr. Perry will continue with the corporation in an advisory capacity and it seems probable that he will continue to live and advise in California.

For the past 10 years Alden Roach has been informally accepted as probably the outstanding and primary independent executive and operator in the steel fabricating field of the far West. Up until a year ago his headquarters and operations centered in southern California, and there are many who feel that he was the outstanding asset acquired when the corporation purchased Consolidated within the past 2 years.

A native of St. Louis 47 years ago Alden Roach graduated from the University of Illinois in 1923 as a civil engineer and for the following 6 years was successively draftsman, transit man, plant engineer, master mechanic, construction superintendent and contracting engineer with railroads, industrial plants and contractors in the St. Louis area and finally at Los Angeles. In 1929 he joined Consolidated Steel Corp. as contracting manager in charge of industrial building division and 5 years later, at the age of 33, he became vice-president in charge of sales and engineering. In February, 1938, not yet 37 years old, he was elected a director of the company and later the same year executive vice-president. In August, 1941, 40 years old, he became Consolidated's president and during the war period was responsible for the huge expansion of that organization in shipbuilding and general fabrication operations, both in southern California and on the Texas Gulf.

IN industrial circles in the far West he is admired and respected for his personal accomplishments, his proved administrative leadership, his commercial and sales courage and his creative imagination as applied to the building and development of industry in the West. Consolidated's latest de-

velopment under his administration has been in developing a fabrication technique for high yield strength, large diameter pipe for oil and natural gas lines and Consolidated is at present committed for the supply of literally thousands of miles for shipment to Arabia, for a line from Texas to New York, and a new line from the Colorado River to the San Francisco Bay area.

"In California's centennial year following the discovery of gold, steel may be said to have definitely and conclusively discovered California," commented president Perry in behalf of Columbia Steel Co. and the parent U. S. Steel Corp. at the dedication ceremonies. The new cold reduction mill at Pittsburg costs well over \$25 million and is only one part, though an important one, in the \$130 million program of expansion in the far West for which the corporation has committed itself since V-J Day. Conversion facilities are being completed at Geneva for the production of all the hot-rolled strip which will be used at Pittsburg and present shipment from Birmingham and Chicago will be replaced by shipments from Geneva after the first of the next year.

Equipment has been ordered and is being produced for a duplicate of the Pittsburg cold reduction sheet mill at Torrance in southern California, to add another 325,000 annual tons of flat products to be available in the southern California market by 1950.

When asked what additional expansion may later be contemplated, president Fairless suggested that it is necessary to digest one big meal before ordering the next, but he intimated that pipe and tubular products production facilities might be next in line for expansion, there being no such major far western plant at present.

The prewar market for sheets in the 11 western states was estimated at slightly in excess of 300,000 tons annually and for tinplate approximately 400,000 tons. The postwar sheet market in the same area is probably in excess of 500,000 tons

[illegible]

This New Ozalith Paper Costs Little—Has Great Mechanical Strength—Washable, Plastic Surface!

THE IRON AGE, October 28, 1948—97

and for tinplate at least 450,000 tons. Over half of the tinplate market of these 11 western states is in northern California and nearly half of the sheet market is in southern California. Therefore it is reasonable to assume that major production in the future at Pittsburg will be for tinplate and at Torrance for sheets.

BEFORE the war Columbia operated a small hot mill on the present site at Pittsburg and a tinplate hand mill with an annual capacity of 30,000 tons to supply approximately 10 pct of the market. These ancient facilities were removed and replaced by the great new mill with 24½ acres of production area under roof.

In connection with the dedication ceremonies officials pointed out that 850 persons will man the new mill whereas 15 or 20 years ago it would have required three times that personnel to produce the same 325,000 net tons annually.

Aside from the positive commitments toward and recognition of industrial development far-westward by the corporation which these major developments at Geneva, Pittsburg and Torrance symbolize, there was in the dedication ceremonies an interesting example of the practically revolutionary change which has come upon the public relations attitude of the U. S. Steel and its subsidiaries.

Present for the dedication, from New York, Chicago and Pittsburgh, were 10 of the 13 directors of the

corporation, including all the principal officers. By special invitation from all parts of the West something like 2300 business, civic, industrial and financial leaders were present for a full day, to be conducted through the plant and entertained elaborately for lunch.

Broadside advertisements were appearing in the local press inviting the general public to visit the plant the following day and arrangements were made to conduct 15,000 or 20,000 neighbors and friends through the mill. All questions were answered and all facilities were open for inspection and approval.

Harvey Co. Buys Plant

Los Angeles

••• **Harvey Machine Co.** has purchased from War Assets Corp. the aluminum extrusion plant which it has been operating since April 1946 for \$1½ million. The plant was set up during the war to produce aluminum shapes, bars and tubes and includes 38 acres of land and a factory building containing 379,000 sq ft of space, and accessory structures.

Starts Fabricating Plant

Salt Lake City

••• **The Lennox Furnace Co.** is establishing a fabricating plant and warehouse to produce furnace

It therefore seems apparent that Columbia Steel and the U. S. Steel Corp. have not only definitely turned far-westward, but also that a hearty and forthright understanding and friendly partnership are henceforth welcome and invited.

In selecting Alden Roach as president, the new course is further charted since his personal growth and experience have been so conclusively and dramatically concerned with and committed to the industrial destiny and resourceful, self-sufficient independence of this restless and robust young empire with its expanding economy.

fittings and eventually complete furnaces using galvanized iron and sheet aluminum. The company has leased a new \$168,000 building from the Anchor Lumber Co.

Program Is On Schedule

Salt Lake City

••• **For 1949 Geneva Steel Co.** is tentatively planning to finish 350,000 tons of hot-rolled strip, 500,000 tons of plate and 160,000 tons of structural mill products, according to Dr. Walther Mathesius, president.

The company's \$18,600,000 conversion program is right on schedule and finishing rolls and coiling facilities for hot-rolled strip should be in full operation by Jan. 1.

Backs Atomic Engineering

Spokane

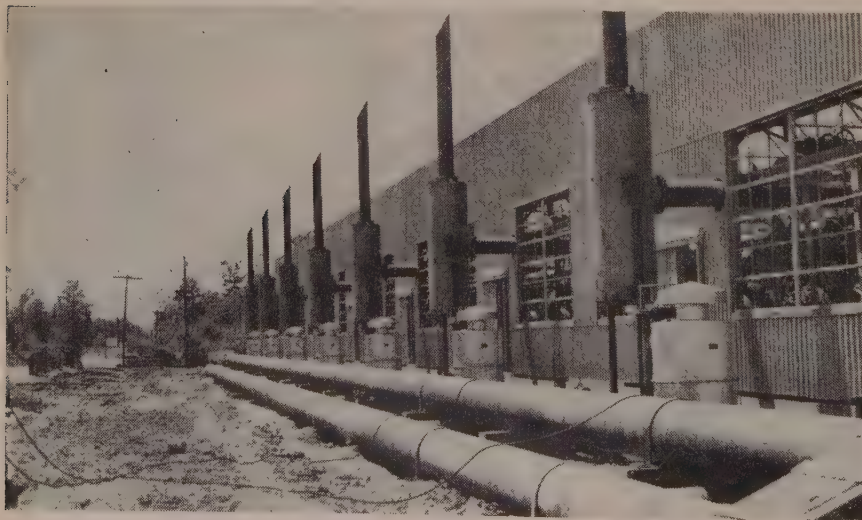
••• **An average of \$20 million** per month for the next year will be expended by the government at the Hanford Atomic Engineering Works in the Richland-Pasco-Kennewick area of the Columbia Basin, according to Senator Harry P. Cain in a local report.

Expanding Facilities

Flint

••• **The AC Spark Plug division** of General Motors was granted a permit for a building of approximately 150,000 sq ft, which will be added to its spark plug plant in Flint.

GAS LINES: A \$10 million construction program to enlarge delivery capacity of natural gas to 508 million cu ft per day has been launched by the Texas Eastern Transmission Corp. at 21 gas compressor stations. When the stations are completed, they will have a total of 239,900 hp.



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| Wood Working Benches | • Hanging Cabinets | • Folding Chairs | • Work Benches | • Bar Racks | • Hopper Bins | • Desks |
| Economy Locker Racks | • Welding Benches | • Drawing Tables | • Drawer Units | • Bin Units | • Parts Cases | • Stools |
| | | | | | | • Sorting Files |
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PERSONALS

• • •

• **Harold F. Kirkpatrick** has been elected vice-president of the Marsh Steel Corp., North Kansas City, Mo. Mr. Kirkpatrick has been manager of purchases for the company since 1946, six months after its founding. Before that he was associated with Columbian Steel Tank Co. for 14 years.

• **Dr. John G. Dean** has been appointed head of the industrial chemicals section, Development & Research Div., International Nickel Co., Inc., New York. **O. B. J. Fraser**, assistant manager of the company's Development & Research Div., had been directing the section previously. Dr. Dean has been associated with that section since 1942, serving first as senior fellow for International Nickel's multiple fellowship at Mellon Institute for Industrial Research and then as Advisory Fellow to that program.

• **C. J. Carter**, formerly in the engineering department, Park Works, Crucible Steel Co. of America, Pittsburgh, has been appointed assistant chief engineer, Midland Works.

• **Frank T. Ostrander** has retired as vice-president in charge of the New York office of National Supply Export Corp. He has completed 43 years of service. Mr. Ostrander joined National Supply Co. in 1905 and was assigned to the export department. In 1917 he opened the New York office, becoming vice-president of the export subsidiary, National Supply Corp., now National Supply Export Corp.

• **L. D. Yager** has been appointed division manager of the Detroit Sales Office, Aluminum Div., and industry manager, Automotive Div., Reynolds Metals Co., Louisville, Ky. Mr. Yager came to Reynolds 20 years ago as a machine operator and has served successively in increasingly important capacities. For the last three years he has been product manager of the Sheet Div. at Louisville plant No. 7.

• **A. R. Senter** has been appointed manager of the Ashland Fabricating Div. of Armco Drainage and Metal Products, Inc., in Ashland, Ky., succeeding **Willard See**, who died on Aug. 31. Mr. Senter joined the Road Supply & Metal Co., an Armco subsidiary, in 1940. He became state sales manager in Kansas for the Missouri-Kansas division of Armco shortly after it was organized, and in 1946 became production supervisor of the Hardesty division of the company at Denver.

• **Henry D. Noll** has been appointed manager of the Houdry Engineering & Technical Service division, Houdry Process Corp., Philadelphia. Mr. Noll had been associated for 19 years with Socom-Vacuum Oil Co., Inc., before joining Houdry five years ago. He has served as manager of the project analysis department and as technical consultant for Houdry.

• **Adrian Van Kampen** has been appointed to the southwest sales division, Kerotest Mfg. Co., Pittsburgh, with his headquarters at Houston, in the area formerly serviced by **Walter Cox**. Mr. Van Kampen was formerly associated with Allis-Chalmers.

• **Harvey Shilling** has retired after 31 years with Youngstown Sheet & Tube Co., the last 14 years of which were spent as superintendent of the company's rod and wire plant at Struthers, Ohio. Mr. Shilling is succeeded in this capacity by **Joseph E. Williams**, who formerly served as superintendent of the wire mill for Northwestern Steel Wire and as plant superintendent for Reynolds Metals Co.

• **Ronald A. Johnson** has been appointed assistant to the head of the newly-created Engineering Standards Dept. of the Portland, Ore., plant of Hyster Co. Mr. Johnson has been connected with Hyster's Peoria factory for over six years.

• **B. L. Lerch** has been made factory branch manager of the new St. Louis office of General Controls Co., Los Angeles. Mr. Lerch had formerly been associated with Mercoird Corp. **O. D. Shaddox** has been appointed factory branch manager of the new Oklahoma City office. Mr. Shaddox joined General Controls in 1945 as sales engineer at the Kansas City factory branch.

• **George R. Milne** has been appointed operating manager of National Carbide Corp., New York, and **Russell T. Lund** has been made assistant operating manager. Mr. Milne joined Air Reduction Sales Co. in 1934 as an accountant, transferring to National Carbide in 1941 as chief clerk in Louisville. In 1946 he was made works manager, a position he held until his new appointment. Mr. Lund spent four years with Air Reduction and transferred to National Carbide in 1940. In 1941 he was appointed plant superintendent at Louisville. Mr. Milne continues his headquarters at the Louisville plant and Mr. Lund has his headquarters at the Corporation's Ivanhoe, Va., plant.

• **Ralph W. Seeley** has been named vice-president in charge of sales for Consolidated Western Steel Corp., San Francisco, replacing **Francis S. Howard**, who has been made division vice-president, southern sales division, Columbia Steel Co.

• **A. G. Koenig** has been appointed general sales manager and **G. A. Terhune** advertising manager of C. J. Tagliabue Corp. (N. J.), a subsidiary of Weston Electrical Instrument Corp., Newark, N. J. Mr. Koenig served as general sales manager of the old Tagliabue company before its purchase by Weston. Mr. Terhune continues an affiliation with Tagliabue that began in 1929. Mr. Koenig and Mr. Terhune conduct their sales and advertising programs from the offices of the Weston Corp. in Newark.

• **Herman C. Phelps** has been appointed sales manager, All-State Welding Alloys Co., Inc., White Plains, N. Y. Mr. Phelps formerly served as All-State's west coast regional sales manager in Seattle.

• **J. A. McMahon** has been appointed Cleveland district sales representative of Rigidized Metal for Rigid-Tex. Corp., Buffalo.

• **Edgar G. Hill** has retired from active service with Ford, Bacon & Davis, Inc., New York, but continues with the organization in the capacity of consultant.

• **Walter D. Binger** has been elected a director of National Radiator Co., Johnstown, Pa.



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RECENT TIME STUDY TESTS—conducted by the Methods Department of Worthington Pump and Machinery Corporation in their Holyoke, Massachusetts Air Conditioning and Refrigeration plant—prove that SPEED NUTS* can be applied in 30% less time than other fasteners.

Important time savings like this are possible for Worthington because SPEED NUTS . . .

are self-retaining—hold themselves in bolt-receiving position

eliminate welding, clinching and riveting

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do not clog—save the time required to mask fasteners before painting or tap after painting

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Shorter assembly schedules mean more units produced . . . more profit for your company. In many cases, SPEED NUTS improve product quality, save assembly time and money, and insure delivery of product in good condition. Write us for details on our Fastening Analysis Service or contact your Tinnerman representative. He's listed in major city telephone directories. Tinnerman Products, Inc., Cleveland 13, Ohio.

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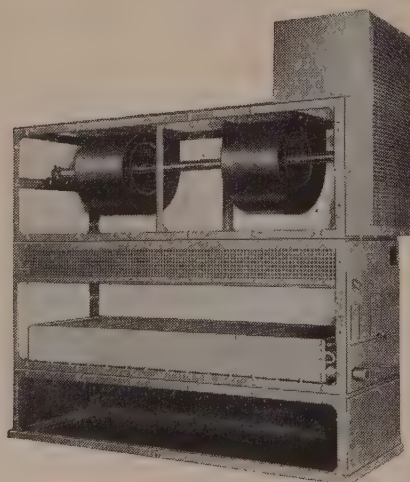
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Assembler aligning panel hole with SPEED NUT prior to inserting bolt—a simple, quick operation.



Zip . . . zip and the panel is secured with a vibration-proof attachment. Panels are easy to remove for servicing of units—SPEED NUTS never "freeze" on threads despite corrosion-producing conditions in these units.



More than 150 SPEED NUTS are used in the assembly of this Worthington Model AVY Commercial Air Conditioner. Panels are removed to show SPEED NUTS in bolt-receiving position.



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Speed Nuts

® Trade Mark Reg. U. S. Pat. Off.

MORE THAN 4000 SHAPES AND SIZES



JOHN H. BATTEN, president, Twin Disc Clutch Co.

• **John H. Batten** has been named president of Twin Disc Clutch Co., Racine, Wis. Mr. Batten joined Twin Disc in 1935. In 1937 he was appointed member of the board and later became assistant general manager, assistant treasurer and vice-president and assistant general manager. In 1945 he became executive vice-president, which position he held until his recent election as president. **P. H. Batten**, founder of the company and formerly president, maintains an active interest as chairman of the board.

• **Henry M. Williams** has joined the Acme Pattern & Machine Co., Inc., Buffalo, as chief engineer of the fabricating equipment division. Prior to his new appointment, Mr. Williams had been sales engineer with Kane & Roach, Inc.

• **H. S. Hill** has been named manager of the Schenectady, N. Y., office of the Trumbull Electric Mfg. Co., Plainville, Conn., responsible for company relations with General Electric Co. **A. T. Allison** succeeds Mr. Hill as district manager of the company's southeast sales district at Charlotte, N. C. Mr. Allison formerly served as sales representative.

• **Howard C. La Mere** has been appointed to represent Automatic Control Co., St. Paul, in the Chicago trade area. Mr. La Mere has been handling the company's line from Minneapolis for several years.

• **Frank T. Kalas**, vice-president in charge of sales and a director of the Electric Storage Battery Co., Philadelphia, has retired after 49 years with the company. **Carl F. Norberg**, vice-president in charge of manufacturing, has been elected a director to fill the vacancy caused by the retirement of Mr. Kalas. Mr. Norberg has also been granted executive authority with the power to act as president or executive vice-president in the event of their absence or inability to act. **Roland Whitehurst**, Exide sales manager, has been elected vice-president in charge of sales. Mr. Whitehurst has been in the employ of the company for 40 years. He served as manager of the Washington Branch for 20 years and in 1940 was appointed assistant sales manager of the company and later made sales manager.

• **C. I. MacGuffie** and **R. C. Freeman** have been appointed manager of sales and manager of engineering, respectively, of G.E. Welding division, General Electric Co., Schenectady. Mr. MacGuffie formerly served as manager of sales for the Welding Equipment Div. and Mr. Freeman has been division engineer for D-C Welders at the Fitchburg, Mass., plant.

• **Joseph A. Martino**, president, National Lead Co., has been elected to the board of Doehler-Jarvis Corp., New York.

• **John Nieman** has been appointed general foreman of the large core room of the foundry division in the manufacturing department of Caterpillar Tractor Co., Peoria, Ill., replacing **Robert Hodgson**, who has left the company. **Clarence Turner** has been named foundry superintendent in charge of all foundry operations on the second shift. **Russell Zimmerman** has been assigned to the post of third shift general foreman. **Luke Gunn** and **Earl Biddison** have been placed in charge of all molding operations on the first and second shifts.

• **Raymond P. Wiggers** has been appointed advertising manager of the Frank G. Hough Co., Libertyville, Ill. Mr. Wiggers had formerly been associated with Towmotor Corp. and the Parker Appliance Corp.

• **Orrin E. Fenn** has been appointed chief engineer of the Grand Rapids Div., Newcomb-Detroit Co. In addition to his duties as chief engineer, Mr. Fenn heads up sales engineering for Newcomb-Detroit in western Michigan, Indiana, Illinois and Wisconsin. Mr. Fenn had formerly been associated with Peters-Dalton Co. and R. C. Mahon Co.

• **Robert J. Casterton** has been appointed sales representative in the Pittsburgh district sales office of the Spang-Chalfant Div., National Supply Co., Pittsburgh, succeeding **William F. Hart**, who died. Mr. Casterton joined National Supply in 1939. **Hubert Chappie** has been appointed superintendent of the foundry at the Torrance, Calif., plant of the National Supply Co. Mr. Chappie has been associated with Lebanon Steel Foundry, Texas Electric Steel Casting Co. and Columbia Steel Co.

• **John D. McCrystle** has been named assistant to the president of the Upson Co., Lockport, N. Y. Mr. McCrystle had been associated for many years with the Brown Co. in Canada and in Berlin, N. H., and has also served as management consultant in New York for the paper, textile and plastics industries. At different times he has been connected in an executive capacity with Johnson & Johnson and the Barrett division of Allied Chemical & Dye Co.

JOHN D. MCCRYSTLE, assistant to the president, Upson Co.



William C. Osborn has resigned a director of Phelps Dodge Corp., New York. Mr. Osborn served as director and member of executive committee for a period of 40 years from the time the company was incorporated in 1898. **Vanderbilt Webb** has been elected to fill the vacancy created by Mr. Osborn's withdrawal.

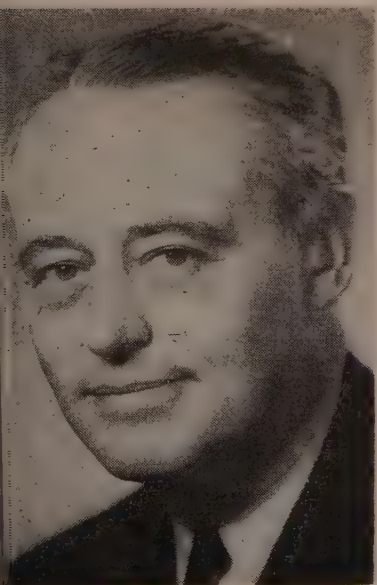
Joseph A. O'Malley has been named general sales manager of the Chrysler Div., Chrysler Corp., succeeding **Stewart W. Munroe**, who has resigned. **Roy H. Appleton** has been promoted from sales director to assistant general sales manager, succeeding Mr. O'Malley.

Al Bailey has been appointed general manager of Kieley & Mueller with his headquarters at the company's plant in North Bergen, N. J. Mr. Bailey spent 10 years with King & Shepherd and was later affiliated with W. Malcolm Black & Co. when this concern succeeded King & Shepherd.

Warren A. Silliman has joined Technical Metal Processing, Inc., Cleveland. Mr. Silliman formerly served as chief metallurgist, Cleveland Div., the Oliver Corp.

Daniel A. Schaitberger has been elected vice-president in charge of sales of Northern Engineering Works, Detroit. Mr. Schaitberger joined the company in 1927.

DANIEL A. SCHAITBERGER, vice-president, Northern Engineering Works



• **T. K. Stevenson** has resigned as president and director of Westrex Corp., New York, a subsidiary of Western Electric Co. **F. R. Lack**, a member of the board, has been elected president succeeding Mr. Stevenson. **G. L. Best** has been elected a director to fill the vacancy on the board created by Mr. Stevenson's resignation. These changes become effective December 1.

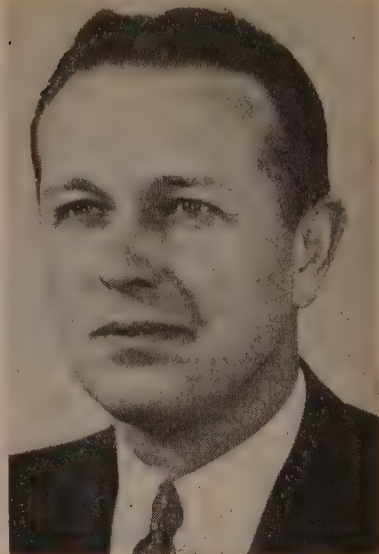
• **Raymond L. Coultrip** has been appointed director of engineering research for Bendix Home Appliances, Inc., South Bend, Ind. Mr. Coultrip had formerly been associated with Maytag Co. **Allen R. Sowle** has been promoted from master mechanic to manager of quality control. Mr. Sowle joined Bendix in 1943 and became master mechanic in 1947.

• **R. Sidney French**, has resigned as research metallurgist for Bridgeport Brass Co. and became associated with Metallurgical Products Co., Brookline, Mass., as vice-president. Mr. French will have his headquarters in Bridgeport.

• **William Burnett**, chief Ford experimental engineer, has been named assistant chief engineer for Ford passenger cars. Mr. Burnett joined the Ford organization in 1946 after 17 years with Cadillac Motor Car Co.

• **Ralph E. Hunt** has been appointed to direct the newly-formed manufacturing and engineering division of Dearborn Motors Corp., Detroit, succeeding **C. R. Powers**, who has resigned to enter private business. Mr. Hunt was formerly connected with General Motors and Nash-Kelvinator.

• **Otis L. Waller** has been named general sales manager of Buick Motor Div., General Motors Corp., Detroit. **A. H. Belfie**, director of merchandising since 1938 and **J. B. Nash**, formerly Pacific Coast regional sales manager, have been named assistant general sales managers for Buick. **Kenneth H. Hendershott** becomes divisional comptroller and **Irving H. Larkin** is the new general superintendent, succeeding the late **Fred W. Letts**.



LYLE A. CHRISTENSEN, vice-president, Marley Co., Inc.

• **Lyle A. Christensen** has been named vice-president of the Marley Co., Inc., Kansas City, Kans. Mr. Christensen has been with the Marley Co. seven years. After serving as sales engineer in the New York office for five years, he moved to the Kansas City office in 1946 and became general sales manager in 1947.

• **Harvey B. Merrill** has rejoined the sales staff of Engineering Products department of Radio Corp. of America, Camden, N. J., and has been named sales engineer for eastern United States with the Scientific Instrument Group.

• **S. L. Nevins** has joined Mathieson Chemical Corp., New York, as general manager of the company's newly-formed ammonia department, with his headquarters in New York and Lake Charles, La. Before joining the Mathieson Corp., Mr. Nevins was associated with Monsanto Chemical Corp. and more recently, Southern Acid & Sulphur Co., Inc.

• **James M. Black, Jr.**, has been appointed public relations director for Associated Industries, Cleveland. Mr. Black was formerly associated with ATF, Inc., and the Daystrom Corp.

European Letter . . .

• Originally designed to supply only western Berlin garrisons, air lift remarkable for achievements . . . Maintenance of long-term program requires reduced British air crews and increased American effort.



LONDON—The air lift is like a knight's move in a game of chess; it enables the west to hold its position in Berlin by jumping over the opposing pieces which threaten it. So far it has achieved spectacular results, but five months of winter and bad weather lie ahead. If the air lift should fail, or if it should have to be substantially reduced, Mr. Bevin, Mr. Marshall and M. Schuman would find themselves where they were four months ago.

The immediate question is, therefore: can the air lift be maintained? In particular, can it survive the fogs, frosts and blizzards of the next four or five months? The experts believe that it can. They base their belief first on the increasing efficiency of the air crews and flying control staffs—the average weight of loads carried is now roughly 4300 tons per day; second, on the extensive use of radar and navigational aids, combined with the opening in December of a third airport at Tegel in the French sector; and third, on the flexibility of the organization—what is lost due to bad weather on one day can be made good by increasing the scale of the operation on the following days. They point out, too, that the present scale of the air lift has enabled the Allied authorities in

Berlin to build up substantial reserves which are there to be used if persistent bad weather should seriously interrupt the flow of supplies. From June 28, when the air lift began, until the end of last week, British and American aircraft together had flown more than 300,000 tons of food, coal and other goods into Berlin.

THE air lift has been and is a remarkable achievement—certainly the most remarkable of the western “cold war” effort. It was originally meant to do no more than supply the western garrisons in the city; almost immediately after it started, its scope was extended to include the German population as well. It was also originally meant to be no more than a short term measure; now it has been developed to cover plans for supplying the western sectors of the city for several months ahead. From concentrating at first solely on food, the air lift now includes coal, industrial equipment and consumer goods; whereas in the beginning it only catered for imports into Berlin, it now brings exports out of the city and has gone some way towards restoring the flow of trade. From makeshift beginnings, it has become the biggest air transport operation ever attempted.

The record of the air lift stands, in fact, as a monument to the Anglo-American genius for improvisation. When the British and American Governments first envisaged the supply of Berlin by air, they thought that it would last only a month at most. Even when that month had passed, it was still continued on a day-to-day basis. It was not until the Moscow talks failed at

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the end of August, two months after the air lift had begun, that long term plans were laid. In the early days, the officers who were organizing the operation, then operation “Carter-Paterson,” were given no figure of the daily tonnage required; they simply provided as much as the aircraft at their disposal could carry. Coordination between the Royal Air Force and the

United States Air Force was loose and informal; civil aircraft—notably the “Flying Tanker” of Flight Refueling Limited—were hired on a weekly basis; air crews got little rest and less leave; and the flying control organization creaked under the strain.

AT first nearly every serviceable aircraft belonging to Transport Command of the RAF was sent to Germany; but experience soon showed that, taking into account the limitations imposed by the loading airport at Wunsdorf and the unloading facilities at Gatow, a smaller force more intensely operated would produce better results. As the operation got under way, the numbers of aircraft and of their return journeys per day were increased. The new runway at Gatow was completed, and additional airports were brought into use at the loading end. Skilled mechanics were sent over from the home commands, and the release of RAF tradesmen and aircrews was deferred.

It was obvious from the beginning that the limiting factor would be the number of aircraft which could land on the Berlin airfields. The Western Powers possess only three air corridors, each 20 miles wide, through the Russian zone. They run from Hamburg, Bückerburg and Frankfurt to the Berlin control area. To reduce congestion, aircraft are routed into Berlin by one corridor and out by another. The flying control organization has also been simplified until it is now possible to accept one aircraft every three minutes at Gatow during daylight. At night the gap is necessarily larger and the theoretical maximum is 480 aircraft per day; the practical limit seems to be between 440-450 aircraft per day. Tempelhof airport in the American sector is being brought up to the same standard as Gatow, and when the new airport at Tegel in the French sector is ready, the practical limit in good weather will be more than 1000 aircraft per day.

THE British share in the air lift has been out of proportion to both Britain's resources and its commitments abroad. Although

British aircraft are bearing more than a third of the burden of air lift, in the beginning they took an equal share with the Americans. Even the present figure is misleading, as the proportion is calculated by weight of the cargoes carried rather than by volume. The masters operating from the British zone carry coal, which is easily loaded and unloaded. The aircraft touch down, unload and take off again in a matter of 30 minutes. The British aircraft, the Lancasters and Dakotas, carry bulky cargoes of miscellaneous items ranging from textiles to potato sprouts, which are neither so heavy as coal nor as easy to stow and unload. The weight carried and the speed of the turn round of British aircraft are therefore both less than the American, though the effort is nearly the same.

Moreover, Britain's commitments abroad are greater than those of the United States. Transport Command of the RAF is responsible for keeping open the trunk routes to most of the eastern hemisphere. Their chief duty is to be ready to deal with emergency transport operations in an area of the world where emergencies like the frequent terrorist campaign in Malaya are all too frequent. The air lift to Berlin has meant that these commitments have had to be slightly reduced. In the present state of world affairs the reduction cannot be acceptable for long.

Much still remains to be done. The differences between the American and British style of doing things is the same as that with which British troops became disconcertingly familiar during the war. Both men and money to spare, the Americans have been lavish. Each American aircraft is attended by three crews and 30 maintenance men. Each aircrew makes only a few consecutive return journeys and is then able to relax in the mess while its colleagues take over. The British are not so fortunate. They are, proportionately, only half the number of air crews per aircraft; their quarters are less luxurious; the return is less frequent. The inclusion of air crews from Australia, New Zealand and South Africa has done much to relieve the strain, but greater reduction in the British effort with a corresponding increase in the American is necessary for the long term program now in progress.



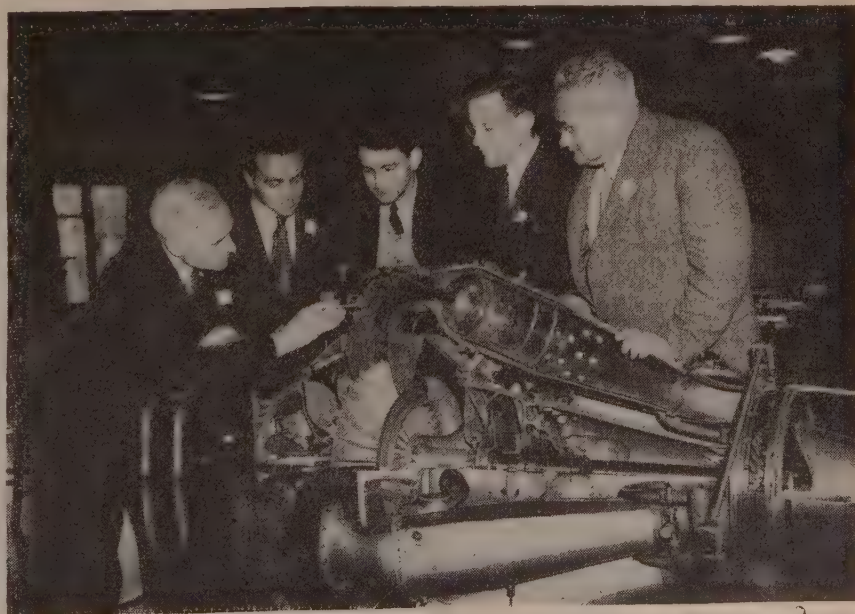
AIR VIKING: This Vicker Viking is the world's first jet-powered airliner. The two-piston engines of the former British European airliners have been replaced with two Rolls-Royce Nene jets which at full thrust can develop some 20,000 hp. Recently the plane flew from London to Paris in 34.2 min. This was also the first international passenger jet flight.

Civilian commentators have from time to time expressed doubts of the ability of the British and American air forces to continue operating in bad weather. So far these doubts have not been justified. On two days last week, for example, there was fairly thick fog over Berlin. The reduction in the air lift during those two days was even less than had been expected—the load carried amounted to approximately two-thirds of the normal. There have not so far been enough days of bad weather to come to any hard and fast conclusions, but the results on those days have fully borne out the experts' hopes that the ef-

fect of winter should not be very great.

The men and the machines working the air lift bear a heavy responsibility. It is the confidence in their ability to continue operating under any conditions that is the mainstay of the West's refusal to negotiate with Moscow under duress. They have undoubtedly impressed the Russians and they may have made them think again before embarking on any more offensives against the West. But the air lift can never be more than a temporary substitute for a constructive policy. For, though it may be cheaper than war, it is too expensive to be continued indefinitely in peace.

NOSES TO THE GRINDSTONE: Students from the school of Gas Turbine Technology at Lutterworth, New Rugby, Warwick, receive instructions in the gas turbine and its industrial applications. The school seeks to foster the growth of the gas turbine industry in Britain. In so doing it has become a virtual United Nations for engineers where men from foreign nations uncover information.



Industrial News Summary...

- **Steel Demand Shows No Dropping Off**
- **Gray Market Small But Very Active**
- **Ingot Output Remains at High Point**

IS the steel shortage lessening? Are there some soft spots? Will steel be easier to get soon?

Does the crop of reports that we are at the top mean that steel output will take care of demand next year? The answer to all of these questions is no! This was revealed by a careful check of the steel market by THE IRON AGE last week.

For the next 6 months—at least—steel will be harder to get than it has been recently. And the use of 6 months is only a guess based on checks with several reliable steel sources. No one thinks that soft spots will develop in steel demand in the near future. Customers to a man are not getting what they want. Nor even what they think is their minimum needs.

If there are some steel users who are getting enough steel to fill up their pipelines, these cases are more than offset by shortages in other places. But the short items are still light, flat-rolled, plate and pipe. The last two are getting shorter when measured by current demand.

Before there is any sign that steel supply is catching up with steel demand the first place to look would be the gray market. This daisy chain mart handles far less steel than is generally supposed. Much of the same steel is being quoted by many brokers. But it is a good indication of how tight steel is. Also the man who buys on the gray market cannot be expected to take a sober long-term view of the steel supply picture. He doesn't.

The crop of reports on the general economy of the country's "catching up" do not apply to steel—yet. Nor do steelmakers or steel users look for any important change in the supply situation for some time to come. Proof of this is in renewed activity of the gray market. Tonnages moving are not large—when measured against total steel output. But there is activity, there are buyers and people are paying fancy prices.

THE gray market is still strong. It is stronger than it was 6 months ago. Sheets and strip are still tight items. But pipe and plates are now taking the center of the stage. Prices for the last two items are quite high this week. And buyers are being found. But the tonnages are not large.

Seamless casing has been offered in the past week for \$280 a ton in small sizes. One large oil firm at the moment is paying \$225 a ton f.o.b. mill for 24 in. electric weld linepipe for a 300-mile line. But prices on other types are often higher. On some larger diameter pipe, prices are over \$300 a ton f.o.b. mill or location of material. The final price runs higher because of the added freight which the user must pay to get the steel.

Only in exceptional cases is gray market pipe being bought by large oil companies. Most of the latter are using conversion plans to get pipe. But sometimes they need small amounts in a hurry. Then there is only one place to go—the gray market.

Because pipe is in great demand, plate prices in the gray market are higher. Six months ago plate could be bought on the gray market for a minimum of \$135 a ton. This week it was being quoted at \$185 a ton or more. The man who buys the plate at those prices usually has to make pipe from it. That adds about another \$100 a ton to the final cost exclusive of the freight involved.

Gray market demand for sheets and strip is still strong. Prices are about the same as they were a few months ago. Without freight and without further processing hot-rolled sheets are selling for \$170 to \$240 a ton. The difference in the price depends on the circumference of the daisy chain, the quality of the steel and lightness of the gage.

Cold-rolled sheets which were once the king pin in the gray market still approach that position. They are selling for \$250 to \$320 a ton f.o.b. mill without freight. There is little chance of much change in these prices soon.

THERE were signs—tiny ones—this week that some steel users were getting fed up with gray market prices. They say that the price they get for their product leaves them too little, if they pay gray market prices. Such a frame of mind is interesting but it does not always last. Maybe this time it will. But in the past these buyers' strikes against gray market prices have started and fizzled out.

Before the coal strike earlier this year, there were signs that the gray market was on its way out. The strike loss of 1.6 million tons of ingots caused the gray marketers to throw their hats in the air with joy. The Congressional hearings put the quietus on some gray market dealings but not too much. Then came the Marshall Plan. Then came voluntary allocations. And finally came news that the United States might arm western Europe.

All of this gave the gray market new life and plenty of people to work on. That is the condition this week. What it will be some months from now is anybody's guess. But it is a sure bet that as long as gray market steel is changing hands at fancy prices there will be no falling off in total steel demand.

Amid the strength of conversion deals and a strong gray market, steel ingot output this week stays at 99 pct of rated capacity. There is no reason why it won't stay there for some time except during holiday periods to come. Even then premium time will probably be paid to keep the wheels going.

F.O.B. MOVE—Fisher Body Div. of General Motors corp. is moving to Pittsburgh in a big way. It will start immediately to erect a 600,000 sq ft stamping plant on a 10-acre site next door to Carnegie-Illinois' Irvin Works. Operations are slated to begin late in 1949 with employment expected to reach 2500. Fisher has also leased from the U. S. Navy a 242,000 sq ft war surplus plant at Ambridge, Pa., which American Bridge Co. used during the war to build landing craft. Production is expected to get under way in 60 days. Initial employment will total 200. The Ambridge plant will blank sheet and coiled strip prior to stamping operations.

ON ICE—The data on shipments of finished steel requested by the Senate Small Business Committee (THE IRON AGE, Sept. 16, p. 123) is being kept under wraps until after Election Day. All but a few of the largest producers have now supplied the committee with the requested information on steel distribution practices. The next move is up to Senator Wherry, R., Neb., committee chairman, who is due to return from his home-state campaign next week. Meanwhile, the committee staff has begun to study and evaluate the returns already in the hands of the Senate.

LITTLE MONEY MAKERS—Publicly reported cash dividends by the iron and steel industry for the third quarter totaled \$77 million, about 15 pct more than for the same period last year, according to the Office of Business Economics. Cash dividend payments reported by all corporations for the quarter amounted to \$1.4 billion, a 14 pct rise over last year.

GET 'EM FLYING—The Texas Engineering Ring and Manufacturing Co. has agreed to step up overhauling of the 54 four engine transports for the U. S. Air Forces from 10 to 25 per month. The speed-up is needed to add planes for the strategic Berlin airlift and for other theaters of operation. Normally maintenance and overhaul work is done by the Air Forces at their own depots. But due to the present day overload on U. S. aircraft, the assistance of private contractors has been enlisted to help in the handling of some of the heavy maintenance.

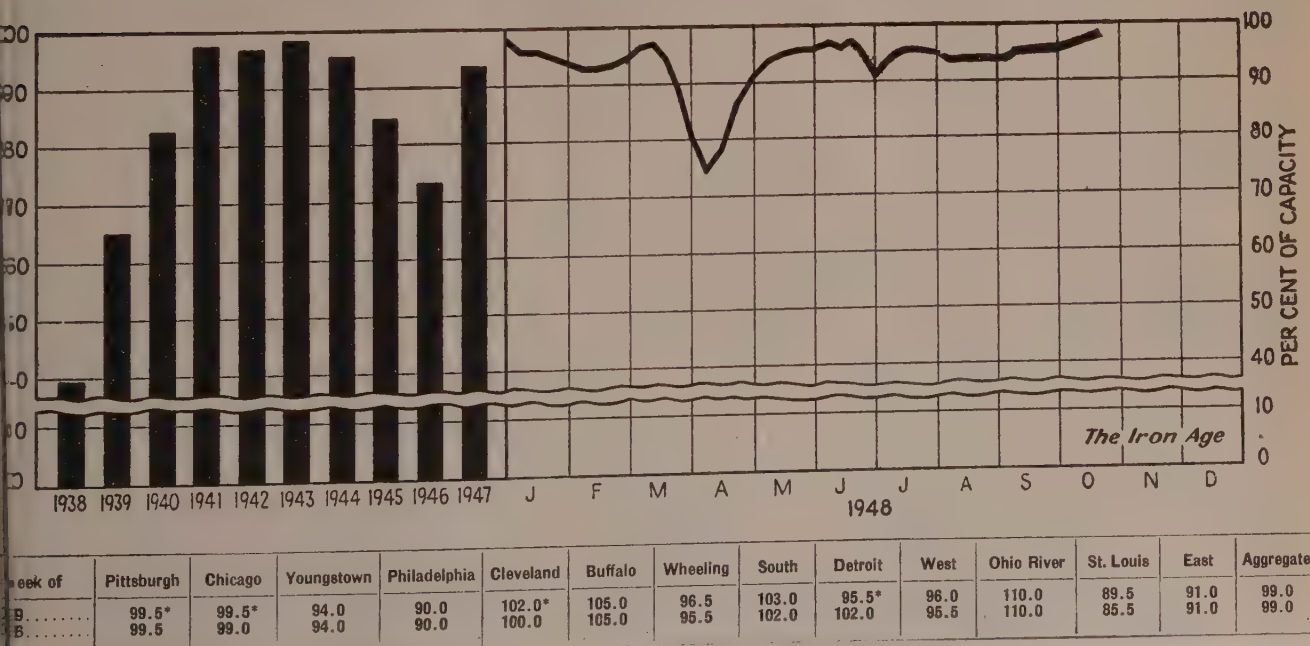
• **SMELTING WITHOUT FUEL**—A new electrical method of smelting and refining iron ore into steel within a ½ hr time interval is in the pilot plant stage, according to Maurice Duplessis, Premier of the Province of Quebec. Alexander Gregoire of the Titan Steel Corp., St. Johns, has been carrying out the experimental work at this plant. When interviewed, Mr. Gregoire stated that no fuel is used, that steel is made from high grade iron ore in ½ hr and that electric power is used. It is apparently still another direct reduction process.

• **SEES A BAD DEAL**—When the normal demand for steel products returns, the f.o.b. mill pricing system will give the Tennessee Coal, Iron & Railroad Co. in Birmingham a hard time, according to M. H. Geisking, vice-president in charge of sales. The new system will slice the company's southeastern market, which ranges from Texas to North Carolina, by 60 pct and even more. He estimates that production of wire products will be reduced to 25 pct of capacity, concrete bars to 30 pct and structural shapes to 46 pct.

• **\$9 MILLION IN RAILS**—The Pennsylvania R.R. placed an order for \$9 million worth of rails with Carnegie-Illinois, Bethlehem and Inland Steel. It calls for 145,600 net tons for delivery during 1949. Of this amount 90,000 tons will consist of two of the two heaviest sections recently developed experimentally by the engineering staff—155 and 140 lb to the yard. The remainder of the order calls for the 133 lb heavy section.

• **TUBE MILL SALE**—The Tube Div. of Detroit Tube & Steel Co. has been sold to Glenn H. McCarthy, Houston oil operator, and International Rolling Mill Products Corp., Chicago. The sale by Sharon Steel Corp., at an undisclosed price, involves only the physical assets and inventory of the tube division. The cold-rolled strip operations of Detroit Tube & Steel Co. are not affected. The new owners are expected to take a large portion of the tube output, which has been running at 2500 to 3000 tons a month. It is understood that Sharon will continue to assure tube round supply for their buyers.

Steel Ingot Production by Districts and Per Cent of Capacity



Revised.

Industry's \$6 Billion Problem

Rust, corrosion and deterioration take an estimated \$6,000,000,000 annual toll. Much of this loss can be prevented by the use of corrosion-resistant equipment and protective coating materials.

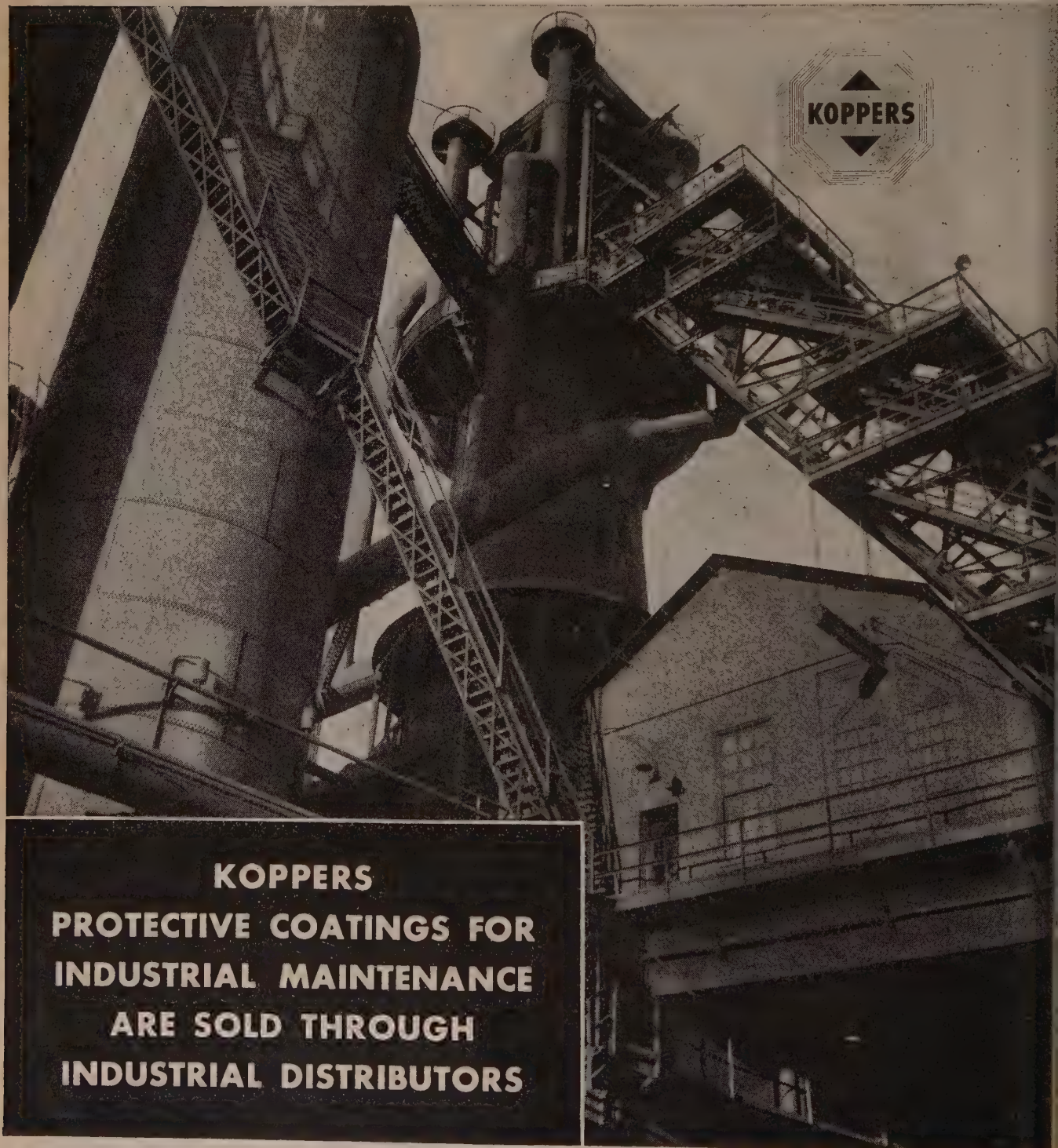
Koppers is one of the largest manufacturers of specialized coatings to protect metal, concrete and masonry. These coatings are waterproof, resistant to chemical fumes, sunlight, and industrial atmospheres. They have an unequalled performance record in virtually every industry. Application requires no special skill.

Koppers Protective Coatings include: Bituplastic,* Bitumastic No. 50, Bitumastic Super-Service Black, Bitumastic Tank Solution, Bitumastic Black Solution, and Bitumastic Hi-Heat Gray.

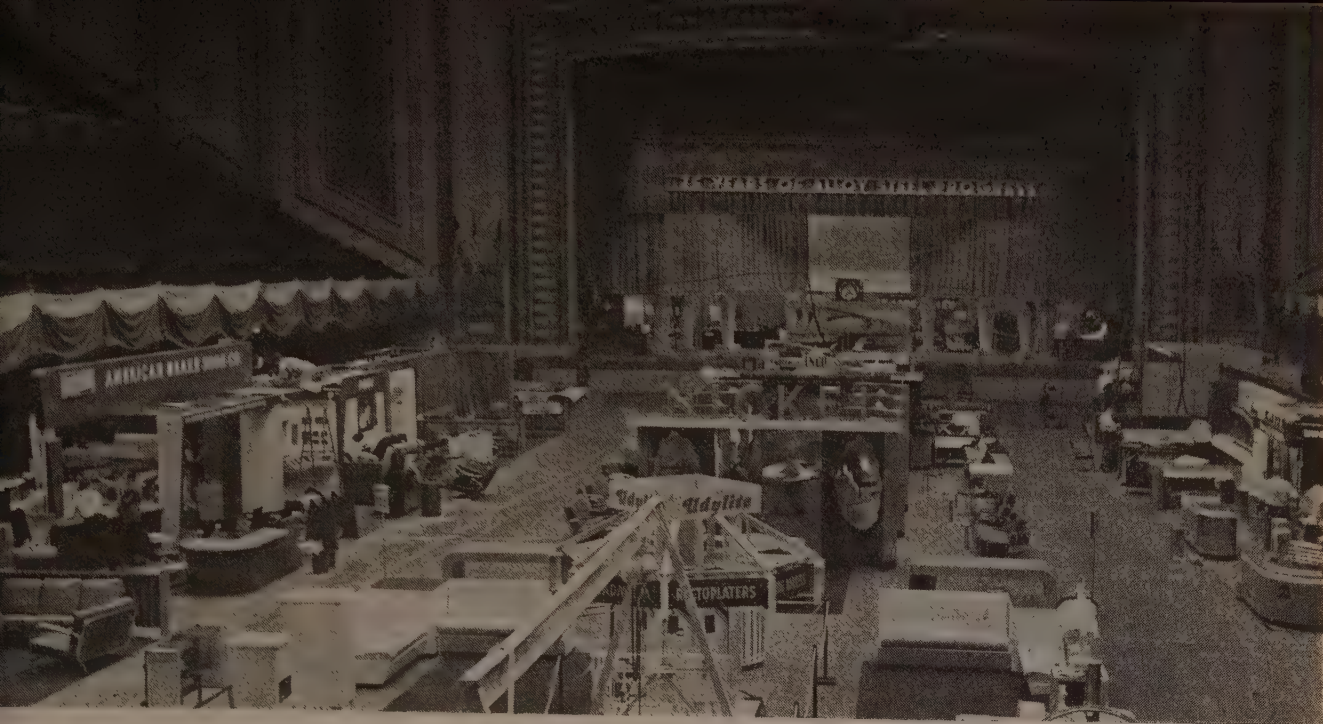
*Trade Mark Reg. U.S. Pat. Off.

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INDUSTRIAL DISTRIBUTORS**



Salute to Alloy Steel—a Fitting Tribute to a Deserving Industry

Philadelphia

• • Salute to Alloy Steel. That's the theme of the 30th National Metal Congress and Exposition at Convention Hall here this week. It's a catchy slogan and an apt theme. It has struck a thunderous response from the industrial throats of more than 350 participating organizations. It is a fitting tribute to a deserving industry. It is a mighty, magnificent salute!

The pioneers who have nurtured the alloy steel industry from its feeble infancy to its present greatness could see no finer fruit from their labor. How could this diamond jubilee more fittingly be celebrated? These exhibits of modern materials and metalworking equipment are refutably demonstrative evidence of 75 years of progress.

A number of living contributors to alloy steel progress will be honored at the annual banquet of the American Society for Metals on Thursday evening, Oct. 28. They will be presented certificates and citations for "meritorious contributions to alloy steel progress."

The more than 350 exhibits extend through Convention Hall Arena, Exhibition Hall, which is directly beneath, and the Commercial Museum, which is adjacent to Exhibition Hall. Here, like a glori-ous fair, the fruits of industry are on display. It took a lot of doin'

First Day Observers Acclaim Spectacle of Alloy Salute As Biggest and Best

• • •

By BILL PACKARD
Ass't News-Markets Editor

• • •

to make it. And it takes a lot of seein' to see it.

Watching this Exposition grow and unfold is an experience long to be remembered. That's why THE IRON AGE, through the medium of photographs, has attempted to record it for you. Whether you are a participator, a spectator or one of the unlucky ones who couldn't make it this year, it is hoped that these photos will provide a bit of the scope and color which is so abundant here.

Again this year the gala event is sponsored by four cooperating organizations. They are the American Society for Metals, the American Welding Society, the Institute of Metals Div. of the American Institute of Mining and Metallurgical

Engineers, and the Society for Non-Destructive Testing.

Each of these prominent societies is presenting a full program of technical papers, educational courses, special lectures and meetings, and social events. In all, more than 200 technical papers will have been presented at the various sessions before the end of this week.

Although the Exposition was not slated to open officially until noon Monday, it was visited by a good number of people before that time. This added to the growing excitement and tension among exhibitors who were by this time working feverishly on the remaining details prior to opening deadline. Each of these little unfinished details seemed disproportionately important to those concerned because of the awful (to them) importance of time.

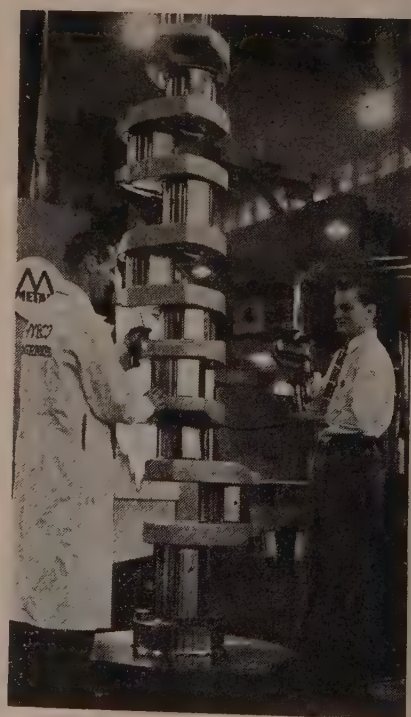
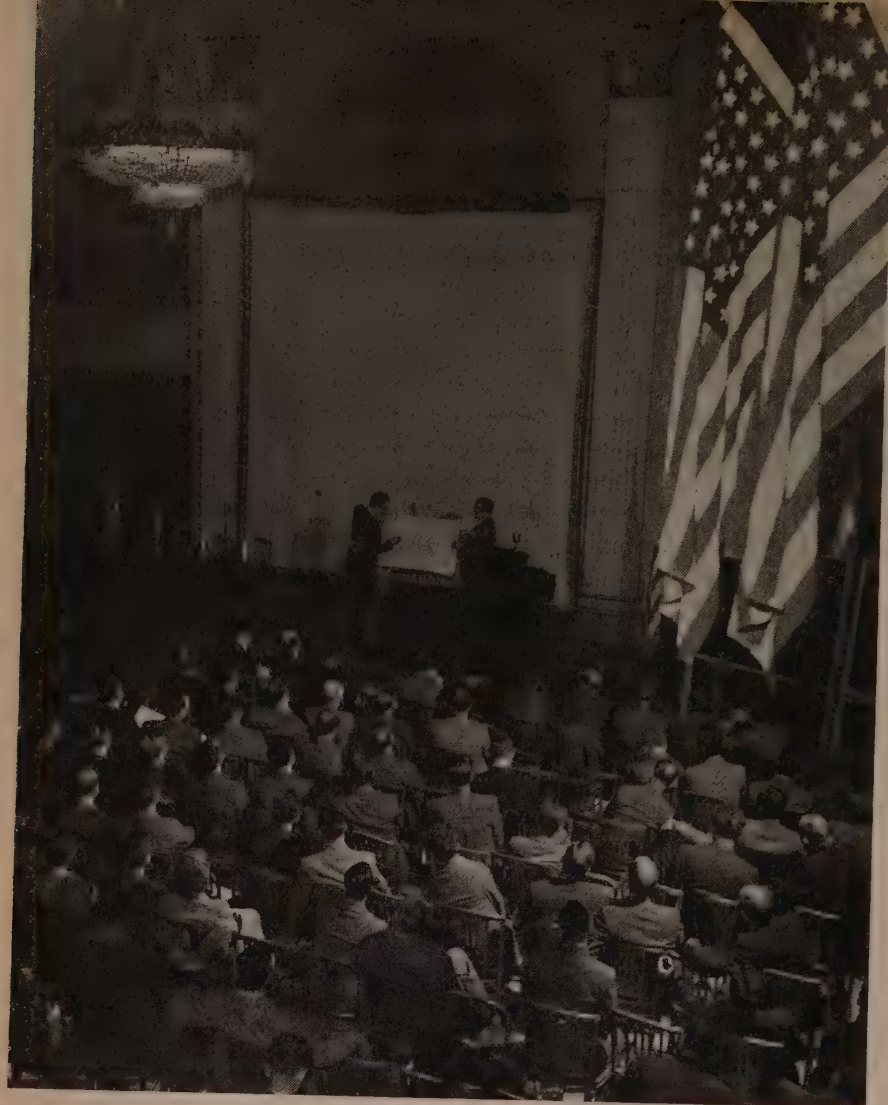
The mounting pressure of slipping minutes had raised the murmur of Convention Hall to a higher pitch. The tension was like that in a copy room bigger than any you had ever seen. You could feel it in the air—that this was to be a big show.

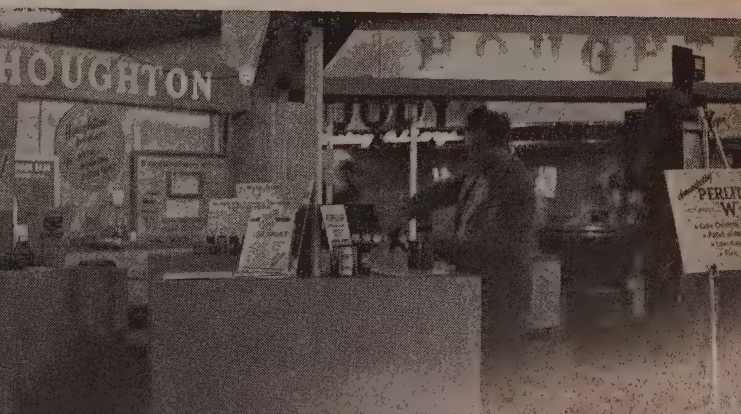
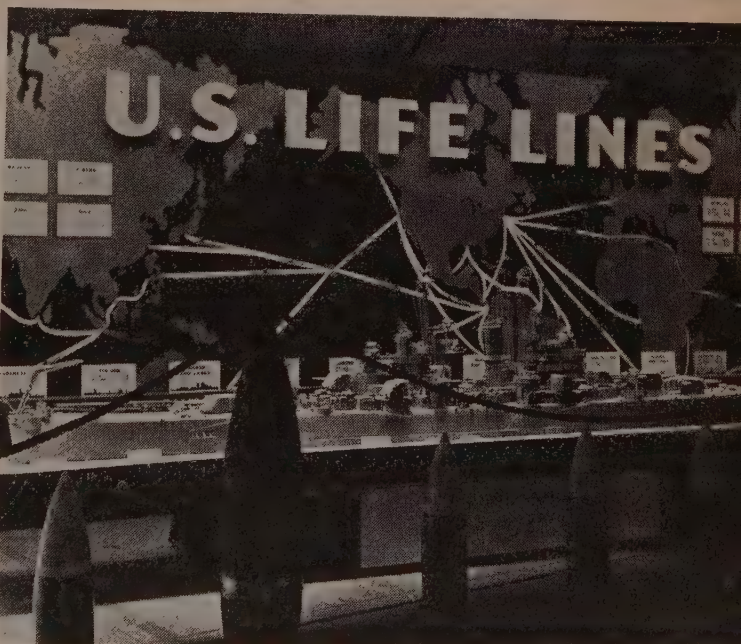
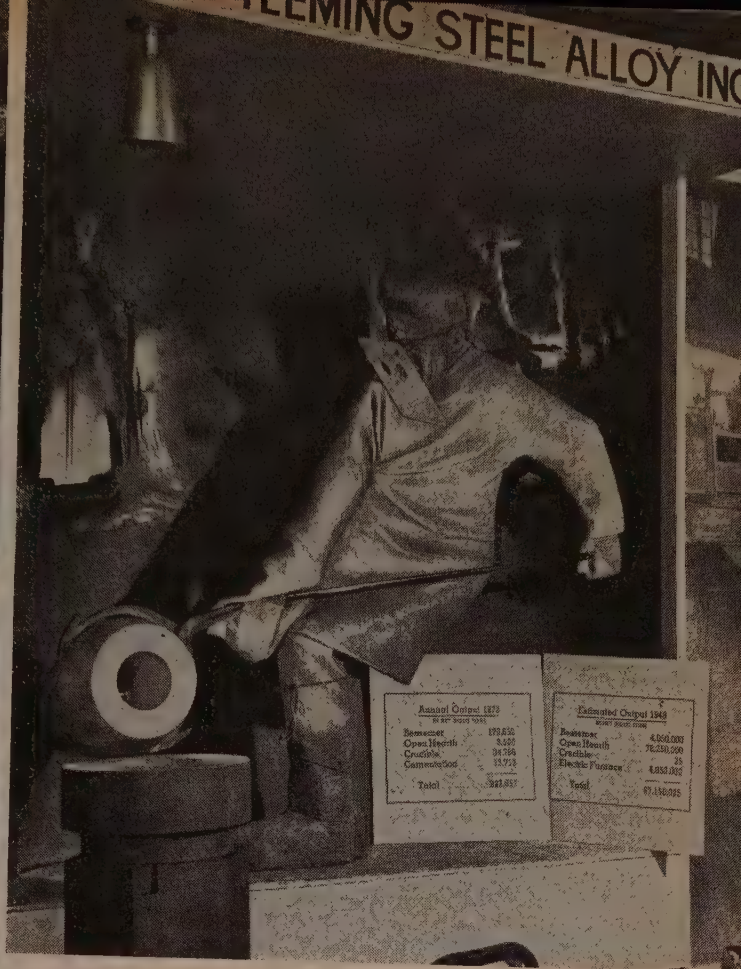
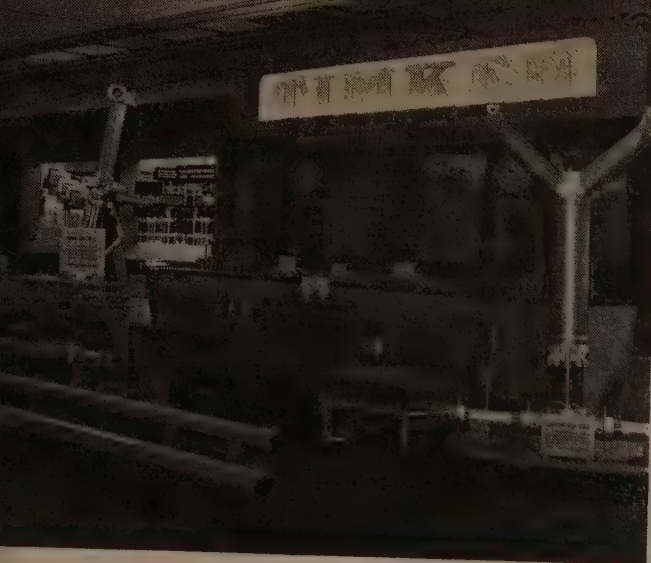
Then at noon the guards opened the front doors, and the 30th Metal Show was underway. The weeks and months of careful planning were now ready to provide the spectacle of a mighty salute to alloy

(CONTINUED ON PAGE 112)

Metal Show In The Making

It took a lot of doing to make it. And it takes a lot of seeing to see it. The Iron Age presents these photos in which it has attempted to capture the color which went into the making of the 30th annual metal show. All pictures were taken at the site of the show except the one at upper left which shows technical papers being presented in ballroom of Benjamin Franklin Hotel.





(CONTINUED FROM PAGE 109)

steel. And what a salute! Seemingly everything was bigger and better—and there was more of it—than ever before. By Monday afternoon the show was receiving the applause and congratulations of a first day attendance which was described as "unusual." This in spite of the inclement weather earlier in the day.

By this time harried officials of the show were beginning to get over opening performance jitters. In spite of their fatigue they were feeling pretty good because they knew they had a smash hit. It was apparent that the men of industry liked what they saw here.

When questioned as to what they thought was the outstanding feature of the show so far, those in attendance gave a variety of answers. They thought there were more exhibits and the exhibits were arranged in more detail. Some voiced high praise of the technical papers which had been presented thus far. Others expressed amazement that so much could be gathered into one exposition. A composite of answers indicated that first day observers thought this to be the biggest and best Metal Show yet presented.

One observer reaction deserves special mention. It is that there was widespread appreciation of the recurring theme of the show. The idea of making the diamond jubilee of the alloy steel industry the central theme of this 30th Metal Show was acclaimed by exhibitors and spectators alike. In connection with this, the cooperation of the exhibitors in working their exhibits in with the central theme was cited as contributing to the overall effectiveness of the show.

The only complaints this reporter heard were from those whose dogs were protesting at the unusual stress and strain. These were delivered in a friendly vein, and were only cited to prove that the sufferer had been led into over-indulgence by his own interest in the industrial exposition.

If American industry needed further evidence of its achievement, it could be found in this show. A few short days ago a vast number of crates, boxes and packing cases began arriving at Convention Hall by rail and truck. They were of all shapes, sizes and weights. Their contents ranged from delicate, precision metal products to enormous multi-ton ma-

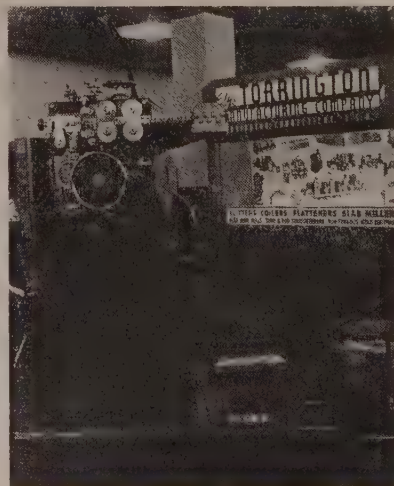


chines. The miracle of it all is that now each piece is in its proper place, contributing its bit to the mighty salute to alloy steel.

The story of what happened in the short time since those crates and boxes arrived is an exciting one. Each exhibitor knows his own individual part of the story. But only when that part is multiplied by more than 350 does the scope of this achievement strike its full impact. There is color and drama here. If industry needed a story to tell, this is it.

But probably surpassing even the story of the magnitude of this show is the story behind the development and fabrication of the products displayed here. This is a story of success and failure—of triumph and heartbreak—of evolution and revolution. This story, too, has its place in the salute to alloy steel.

Interviewing the men who were



working on the exhibits was an interesting, and sometimes amusing, job. In spite of the long hours and hard work, you somehow got the feeling that they wouldn't want to be anywhere else. But that's not so surprising. Being a part of this show is no small satisfaction in itself. Added to that was the keen competition among exhibitors. This competition, along with the general excitement, created a chain reaction of circular response. That, too, helped get the job done.

There can be no doubt that the show was a great boon to inter and intra-organizational teamwork. It was not unusual to see company officials, with their sleeves rolled up, pitching in with the rest of the boys. Most of those here seemed to find it refreshing to meet other people from their company outside the office for a change.

The sales forces came in for their share of work too. Many of them got here in time to help with the arrangement of their companies' exhibits. But that was only the beginning of their work. Their job is selling. And probably never before had they seen so many customers and potential customers in one place before.

The American metalworking industry has come a long way since that bridge spanned the Mississippi River at St. Louis 75 years ago. In those days it would have been impossible to assemble the evidence of industrial achievement which these 75 years of progress have made possible.

But those days were noteworthy ones too, for that bridge spanned more than a river. It spanned an epic in engineering structural steels. That's why the American metalworking industry is rendering this mighty salute to alloy steel on this, its diamond jubilee.

Plant Tours Included

Philadelphia

• • • In addition to the exhibits, technical papers, luncheons, etc., a series of plant inspections are scheduled as a part of the show.

Included among the plants to be inspected are: Philadelphia Navy Yard, Florence Pipe Foundry and Machinery Co., Florence, N. J.; Frankford Arsenal, Westinghouse Electric Corp., Lester, Pa.; Henry F. Disston & Sons, Inc., and Met-lab Co.

Stainless Producers Study New Revisions of Extra Schedules

Philadelphia

• • • The reaction of warehouses and other customers to the new extra schedules for stainless steel and to the abandonment of the distributors discount on these products has already had an important impact on the producing mills.

Steel mill executives are seriously concerned over the threatened loss of an estimated 30 to 40 pct of their warehouse customers now handling stainless steels. Customer reaction to the new extras is just now beginning to make itself felt and some mills have reported taking important tonnages under protest from the buyers.

Some mill officials believe that corrective price action will be taken by the industry within a week or two. Others believe that it may take from three to four months before the action is initiated by a major producer. Alternative measures now under consideration to permit the warehouses to continue to handle stainless include the restoration of a special set of quantity extras for distributors with base quantity set at 5000 lb, half the present base quantity for sales to distributors and mill customers. Several producers have not published their new stainless extra schedules because of their knowledge that changes must soon be made.

One objective of the present extra schedules is to attempt to overcome competition between mill salesmen and those of its own warehouse customers for the same stainless business. For years this duplication of sales effort has troubled the industry, causing embarrassment to customers and to salesmen of mills and warehouses. Mill officials want the warehouses to stay in the stainless market, but they say their efforts should be confined largely to small orders and quick shipments. By lowering the base quantity to 10,000 lb from 40,000 lb, they had hoped to encourage a larger proportion of direct mill sales. The tight stainless market for most products at this time with long term mill delivery schedules should curtail immediate realization of this objective.

Some mill officials would like to restrict their sales of the common

Steel Company Executives Are Concerned Over Estimated 35 Pct Customer Loss

• • •

By JOHN ANTHONY
Eastern Regional Editor

• • •

grades and sizes to a minimum of 2000 lb, referring all smaller orders to the warehouses. This type of thinking, however, is a product of the present stainless market and does not prevail generally in a competitive market. Mills recognize that they must continue to handle

small orders for specialty grades and products.

The importance of the warehouses in the stainless distribution picture is acknowledged by the concern with which producers view recent developments in the market. Consumer protests have centered around the important increase in stainless costs due to the new extras for quantity, size, gage and finishing. Some mills say their customers are not concerned over the price and extra increases because they are now able to place orders at the base price in quantities of 10,000 lb. The net cost to such consumers is nevertheless higher than under the previous price schedule.

Certain of the new extras now applicable will probably remain un-

(CONTINUED ON PAGE 114)

Not Bad, Huh?



Industrial Briefs

• **CORRECTION**—On p. 118 of Oct. 14 issue a news item stated Bethlehem Steel Co.'s Mayari ore as being a Chilean ore due to a typographical error. It should have read that they've been getting their Mayari ore from Cuba.

• **MORE COAL**—Bethlehem Steel Corp. has announced the acquisition of all of the outstanding shares of J. H. Weaver Co. including approximately 12,000 acres of developed coal properties in Cambria and Indiana counties, Pa. and approximately 1400 acres in Harrison County, W. Va. It has also leased from Clearfield Bituminous Coal Corp. approximately 23,000 acres of undeveloped coal in Cambria County adjoining the Weaver coal.

• **BUYS ALUMINUM PLANT**—A surplus, government-owned aluminum extrusion plant at Los Angeles (Plancor 326) has been sold to the Harvey Machine Co. of that city for \$1.5 million. The purchaser has been operating the property since April 1946 under a 5-year lease.

• **ITALIAN SUBSIDIARY**—Vanadium-Alloys Steel Co., Latrobe, Pa., has formed a subsidiary, Vanadium-Alloys Steel Societa Italiana, in cooperation with Elli, Zerboni & Co., Turin, Italy. Prompt delivery will be made from warehouse stocks in Turin, Milan and Genoa; also metallurgical assistance will be rendered to European customers.

• **NEW ASSEMBLY PLANT**—General Motors newest automobile assembly plant and its first such unit in New England has been opened at Framingham, Mass. The plant is a unit of the Buick-Oldsmobile-Pontiac Assembly Div. and is managed by C. S. Swayze.

• **EXPANSION PROGRAM**—Penn Metal Co., Inc., has announced that it is constructing an addi-

tion to its office building and its main plant at Parkersburg, W. Va. Also being erected is a new pattern and die storage building.

• **ALUMINUM ALLOYS**—Vanadium Corp. of America is opening an aluminum alloy plant at Eddystone, Pa. The company is in the process of altering leased facilities and the plant is expected to be in operation by the end of this month.

• **ENTERS AGREEMENT**—A joint agreement between Frederic Flader, Inc., North Tonawanda, N. Y., and Clark Bros., Co., Inc., Olean, N. Y., has been entered into whereby Clark will manufacture and distribute gas turbines and axial compressors of the Flader design for general industrial use.

• **TORONTO OUTLET**—The E. F. Houghton & Co., Ltd., Canada, an affiliate of E. F. Houghton & Co., Philadelphia, has announced the opening of their Toronto plant at 100 Symes Road. They will manufacture metalworking and heat treating products and lubricants.

• **PRODUCES AIR VALVES**—Viking Products Co., Inc., 2373 E. Eight Mile Road, Detroit, a new company organized to produce automatic air valves, has announced completion of its developmental program and installation of equipment for mass production at its Vicksburg, Mich., plant, on an entirely new line of solenoid operated air valves to be marketed under the trade name of "Ring-Seal."

• **ADDS WAREHOUSES**—The Marsh Steel Corp., North Kansas City, distributor of all types of carbon and alloy steel products, also copper, brass and aluminum, will open two new warehouses this month in Denver and Dallas.

(CONTINUED FROM PAGE 113)

changed. Mill cost studies have shown that for years the heavy gages of sheet and strip have carried the burden of light gage business. Even the recent sharp increases in the lighter gages do not fully compensate for their production, some mills say. While mills still produce 24 and 26 gage sheet, some sales executives say they would be glad to refer this business elsewhere if possible.

Current size extras for sheets are expected to remain unchanged, largely to encourage consumers to take advantage of strip sheet now available in greater widths. Produced on new wide continuous strip mills, this product offers a real price advantage to the consumer. However, some buyers believe that there are certain physical advantages in sheets produced from sheet bars cross-rolled to width.

Carnegie-Illinois and **Republic Steel** are able to produce strip sheet up to 48 in. wide. Soon Republic will be able to offer strip sheet up to 60 in. wide by the use of interchangeable rolls on the present mill. Armco produces strip sheet in heavy gages up to 36 in. wide. When its new Szendzimer mill is available for stainless production, light gages up to 36 in. will be offered. Allegheny Ludlum and Crucible Steel are also installing wide strip mills.

Prices of stainless products are now in a chaotic condition. Bar prices are particularly confusing. Major producers have followed the Armco schedule. For most, this represents a second change, the first being the pattern established by Carnegie-Illinois, which now also has adopted the Armco list. However, the prices of independents are all over the lot. Sheet and strip prices are less confusing with all major producers following the schedule of Carnegie-Illinois, but there are fewer independents who have not conformed. At first, most producers merely raised base prices 10 pct over the old schedule and revised extras. The 10 pct increase did not raise prices of the light gages as much as the new schedule. But the latter make the heavy gages more reasonable. Compounding the conclusion is the fact that some of the warehouses are selling their inventories at the old prices.

Fabrication-in-Transit Business Hurt by F.O.B. Mill Steel Sales

Pittsburgh

• • Fabrication-in-transit has not been stimulated by f.o.b. mill selling. Structural steel fabricators don't like the effect of f.o.b. on FIT. Steel companies like it fine insofar as it has eliminated what they call the abuses of the transit privilege. It has increased fabricators' costs to the extent that f.o.b. sales have increased any steel user's cost. It has reduced their market areas. In slack times FIT brought about keen competition between steelmakers; under the present setup that competition can not exist even if steel demand tumbles.

Traffic managers of major independent fabricating firms in this district point out that although they still use fabrication-in-transit some of the conditions surrounding it have changed. Fabricators employ topnotch traffic men able to take advantage of everything the FIT rules allow. They violate nothing in the tariff regulations. They still make money by switching freight bills—a legal practice. But their buyers can no longer wangle price concessions from steelmakers to meet certain competitive conditions. Long distance markets would be closed if they had to compete on a price basis.

Steel companies are not unhappy about this phase of the change to f.o.b. mill marketing. Under multiple basing point selling they objected strongly to several aspects of FIT. They could never be sure of the ultimate destination of an FIT shipment so they absorbed freight and cut prices right and left. Sometimes they had to, sometimes they didn't—they never knew.

Steel companies railed at what they called the "abuses" of the transit privilege and fought its extension to additional steel products. Carnegie-Illinois in 1946 called these "abuses" "unfair, unjust and economically unsound." The Supreme Court and the Federal Trade Commission have now eliminated this type of steel company competition.

Most railroads permit certain steel products to be stopped at certain points along their lines for

Law Now Bars Steel Companies Competing for Structural Fabricators' Orders

• • •

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

Background

New York

• • • The Federal Trade Commission believes f.o.b. mill selling promotes competition in steel marketing. A majority of the FTC believes a uniform mill net price is also essential—an opinion which Lynn C. Paulson, trial examiner in the current case against the steel industry, does not share. THE IRON AGE has examined this little-publicized aspect of steel marketing to see if f.o.b. selling at uniform mill net prices has increased or stifled competition.

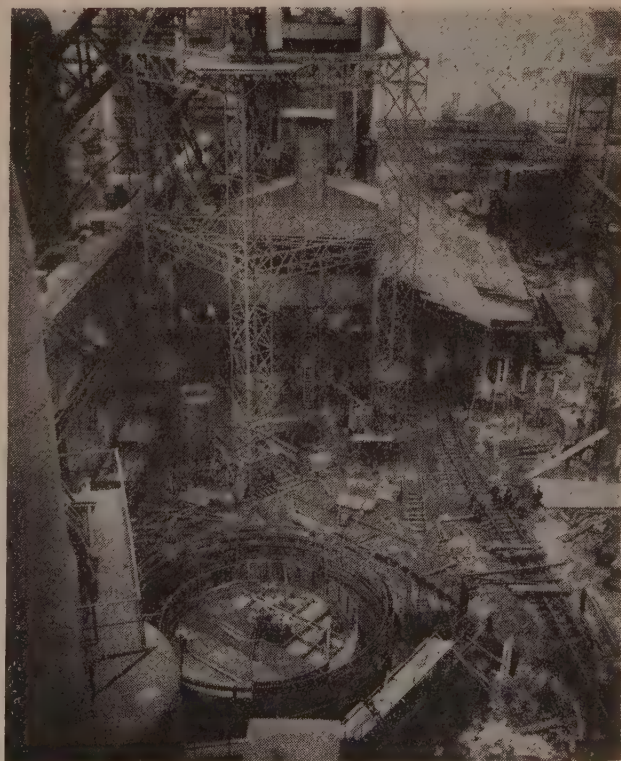
fabrication and subsequent reshipping at the through rate from the origin of the steel product to the

final destination of the fabricated steel. To this they add a transit charge of about 5¼¢ per 100 lb. In Eastern Territory, where the bulk of iron and steel is made and fabricated, shapes, plates and bars are the only steel articles involved in FIT.

Assuming a buyers' market, a shipment of plates from Youngstown for fabrication at Pittsburgh and thence to a Philadelphia bridge job will serve as a basic example. The Youngstown-Pittsburgh rail rate is 20¢ per 100 lb; the Pittsburgh-Philadelphia rate is 49¢. The total of these two local rates is 69¢. But the through rate from Youngstown to Philadelphia is only 55¢ per 100 lb. Total freight charges if the plates are unloaded at Pittsburgh, fabricated, loaded and shipped to Philadelphia will be about 60¢ per 100 lb (55¢ through rate plus about 5¢ transit charge).

Still assuming "normal" market conditions, the Youngstown steel producer would recognize the Pittsburgh base price under the former multiple basing point system. Knowing the Pittsburgh fabricator

• • •
SUPER STRUCTURE: Workers are erecting at Port Talbot in Wales what will be the largest blast furnace in Europe when completed. The new project which is scheduled for completion in 1951 will cost approximately \$250 million. In the background are old iron furnaces that are to be pulled down and replaced.



would pay that price plus, say 5¢ switching charge, he would absorb 15¢ in freight to sell the Pittsburgh fabricator. The latter would submit proof to the railroad that 20¢ (Youngstown-Pittsburgh) had already been paid in freight on the shipment. He would owe the balance on the haul to Philadelphia (55¢ less 20¢, plus 5¢ transit charge)—or 40¢.

But if the Pittsburgh fabricator bought his steel in Pittsburgh he would have to pay the full Pittsburgh-Philadelphia freight of 49¢—he would have no freight bill to offer for credit (switching and transit charges would cancel each other).

Result: A Pittsburgh mill seeking that business would have to cut its price by 9¢ per 100 lb. It would have to shade \$1.80 a ton from its plate price so the fabricator would break even whether he bought the steel in Youngstown or Pittsburgh.

Perhaps the Youngstown producer didn't want the business. Perhaps its mill was booked for several months on plates and was not interested in absorbing \$3 a ton to get the Pittsburgh fabricator's business. But the Pittsburgh mill didn't know that and it engaged in shadow boxing to the tune of \$1.80 per ton.

Now the fabricator pays all the freight (except what he saves by the FIT privilege). Steel companies no longer absorb freight into this district—what little was left ended with the mid-year change-over to f.o.b. mill selling. The fabricator can no longer play one mill against another for price concessions—the law says mill net prices must be uniform.

Pressure Blast Furnaces Show Greater Production On Little Maintenance

Cleveland

• • • Operating results for two blast furnaces at Chicago and Warren, Ohio, which were recently converted to high top pressure operation, have been announced by E. M. Richards, vice-president of Republic Steel Corp. Mr. Richards said that three more conversions are under way, one of them the Buffalo No. 2 furnace, to be completed in October.

With the two recent conversions, Republic now has four furnaces operating on high top pressure, located at Cleveland, Youngstown, Warren and South Chicago.

Mr. Richards reported that operating results of the present four pressure furnaces confirm expectations of higher productivity and greater economy based on experimental operations begun in cooperation with Arthur D. Little, Inc., in 1944 and that mechanical difficulties encountered in the early experiments have been reduced so that lost time on a pressure furnace is now no more than on a normal blast furnace.

Erosion of the bell and hopper was one of the early problems, but the hard-surfaced, one-piece hopper and the hard-surfaced bell on the Cleveland furnace have been used continuously for 26 months and are still in excellent condition.

The Chicago furnace, Mr. Richards said, has only been on top pressure for a period of 3 months, but broke its tonnage record in

August by producing 3000 tons more than in any previous month since the furnace has been in operation.

The Cleveland pressure furnace, operating on essentially a straight ore burden, has averaged 1250 tons a day for the last 6 months at a wet coke rate of 240 lb per ton of iron less than any other furnace in the Cleveland district.

During the same period of operation the furnace has produced an average of only 117 lb of flue dust per ton of iron while being blown at a wind rate of 90,000 cfm.

The Youngstown No. 3 pressure furnace for the same 6-month period has produced an average of 170 tons more a day at a coke rate 300 lb less per ton of iron than the Youngstown No. 1 furnace. The No. 1 furnace is of exactly the same size and operating on approximately the same burden, but at normal top pressure.

The pressure furnace at Warren has been producing over 1340 tons per day while operating at 6 lb per sq in. top pressure and 92,000 cfm with two old turbo blowers run in parallel. Installation of a new 125,000 cfm 40 lb per sq in. turbo blower has just been completed. The furnace is now being operated at 10 lb per sq in. and the new blower will permit operation at top pressures exceeding 12 lb per sq in. with consequent increase in tonnage and lower coke rates.

Blast furnace men from various parts of the world are visiting the pressure furnaces and following closely the operating results. Other steel companies here and abroad will also have pressure furnaces in operation within the next 6 months.

SHIP SCRAP: French workers have diked off the Loire River and nearly drained the enclosed area to salvage ships which the Germans sank in their famous defense of the St. Nazaire pocket on the Atlantic coast.



Named to National Board

New York

• • • Harry F. Gracey, director of management development of SKF Industries, Inc., has been elected as Pennsylvania representative on the board of directors of the American Society of Training Directors.

A former president of the Pennsylvania Society of Training Directors, Mr. Gracey succeeds Russell Beamer of the Rochester & Pittsburgh Coal Co. He has been associated with the Philadelphia ball and roller bearing firm since 1946.

New Officers Selected By Gray Iron Founders

Atlantic City, N. J.

• • Hermann P. Good, foundry superintendent, Textile Machine Works, Reading, Pa., was elected president, Gray Iron Founders' Society, at the society's annual meeting here. He succeeds H. A. Stockwell, treasurer, Barbour Stockwell Co., Cambridge, Mass.

Other officers elected were: John E. McIntyre, vice-president and general manager, Sibley Machine & Foundry Corp., South Bend, Ind., vice-president; Robert J. Schaefer, chairman of board and treasurer, Schaefer-Goodnow Foundries, Inc., Pittsburgh, secretary; and Henry J. Trenkamp, president, Ohio Foundry Co., Cleveland, treasurer.

New directors of the society are: H. L. Edinger, president, Barnett Foundry & Machine Co., Irvington, N. J.; J. W. Simmons, Jr., secretary-treasurer, Cox Foundry & Machine Co., Atlanta; E. B. Herwin, president, Chicago Hardware Foundry Co., Chicago; C. F. Scherer, president, Davenport Machine & Foundry Co.; H. D. Cayor, president, C. & G. Potts & Co., Indianapolis; A. E. Thomas, president, Thomas Foundries, Inc., Birmingham; and S. D. Russell, president, Phoenix Iron Works, Oakland, Calif.

Incumbent directors retained on the board are: G. F. Hutchins II, treasurer, Standard Foundry Co., Worcester; H. P. Good, R. G. Schaefer, H. J. Trenkamp and E. McIntyre.

Allegheny Ludlum Open House Has Novel Twist

Pittsburgh

• • • When the town declares a legal holiday, closes the schools, lowers the parking meters and turns out the band you have the makings of a successful plant open house. This was the technique applied last week at West Leechburg, Pa., when Allegheny Ludlum Steel Corp. held open house for the plant employees there as well as the townspeople and company stockholders in the district.

At the plant there was at least the idea believed relatively new in open houses. At the end of the plant tour a score of exhibit booths were set up and manned by cus-

tomers of the company. These displayed the stainless and alloy steel products of various fabricators who buy from Allegheny Ludlum. A 24-page illustrated booklet complemented the usual signs that were set up at each operation along the route.

Within the two neighboring boroughs where the West Leechburg plant employees live all stores were closed. Free coffee was supplied by local merchants. The two school bands played in the plant during the day while the local firemen's band played at night. The fire department also acted as police to handle visiting crowds.

Several hundred stockholders were among the visitors. Company officials had asked them to wear identifying armbands so the workers might see some of the people who provided the money for their tools. The school children who had a holiday were escorted by their teachers. Their task for the day—to write a theme on what interested them most at the mill.

Rough Sledding Ahead For Appliance Makers

Washington

• • • The Commerce Dept. sees tougher sledding ahead for the electrical appliance industry.

Sales of household electrical appliances may continue next year at a rate only slightly less than the

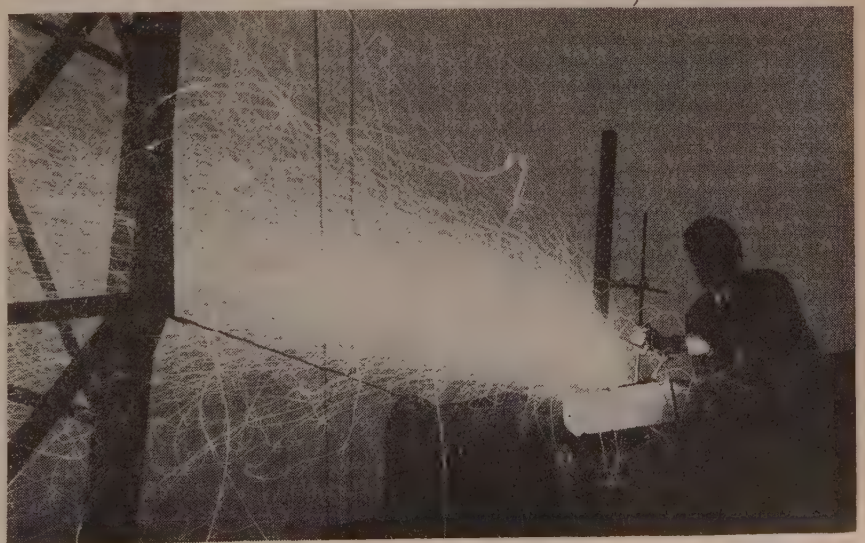
1948 rate, but from the production standpoint the less efficient producers and those new manufacturers who are unable to develop some degree of public acceptance for their product are slated to fade out of the picture, according to the department.

Uncle Sam's economists go on to predict that "name brands" will have the best chance of survival in the months ahead, adding, however, that "it wouldn't be surprising if some of the long-established firms that are venturing into the electrical appliance field for the first time find the going rough and decide to abandon their newly-adopted sideline."

"Without question, the months immediately ahead will be a period of adjustment and jockeying for position which will determine what brands will survive and will set the pattern for the future of the industry," according to the agency.

However, the market for household electrical appliances has expanded tremendously. There are today 6 million more residential electric customers than there were in 1942 when electrical appliance production ceased. This represents an increase in the potential market of 23 pct. Still further expansion is anticipated, due to the high rate of residential construction and the extension of electric lines to some 1.5 million rural consumers.

JUST A LITTLE RAINMAKER: This charcoal burning generator disperses millions of tiny silver iodide particles into the atmosphere. They serve as nuclei upon which supercooled or below freezing water droplets in a cloud crystallize into snow. The snow may then turn into rain, depending on the temperature, and humidity of the atmosphere near the ground. The gadget is expected to undergo extensive experimentation in actual weather conditions by the U. S. Army Signal Corps and the Office of Naval Research under the program known as Project Cirrus.



AEC Negotiates With VCA For Purchase of Uranium

Washington

••• The U. S. Atomic Energy Commission is negotiating with the Vanadium Corp. of America for the purchase of uranium from two treatment plants which VCA will bring into operation in 1949.

One of these plants is the commission-owned vanadium-uranium mill at Durango, Colo., for which a lease is being arranged. The other is a new plant to be erected by the company in the White Canyon district of southeast Utah.

Under terms of the tentative agreement the government-owned processing plant at Durango will be rehabilitated by Vanadium Corp. at a cost to the company estimated to be more than \$200,000. The plant, a vanadium mill formerly owned by the U. S. Vanadium Corp., will be leased to the Vanadium Corp. of America. Operations probably will start in late 1949.

It is anticipated that ore will be supplied principally by VCA mines. Independent operators will be able to deliver or under the terms of the commissions ore purchasing program.

Part of the ore to supply the plant may come from properties now held by the AEC on the Navajo Indian Reservation. Negotiations are in progress between the commission and VCA for the subleasing of these properties to the company on a royalty or similar basis. If this plan is approved, royalties on all minerals extracted will be paid to the Bureau of Indian Affairs for the Navajos. A relatively small amount of ore was mined on the reservation during the war.

Canadian Expansion Job Costs About \$51 Million

Toronto

••• By the end of this year the Steel Co. of Canada Ltd. will have spent approximately \$51 million on improvements and plant additions since the end of 1939, H. G. Hilton, president, announced.

The major items in the expansion program included: 61 coke ovens with annual capacity of 400,000 tons of coke; 1 blast furnace, annual capacity 350,000 tons of pig iron; 2 openhearth furnaces, annual ca-

capacity 215,000 tons of ingots; 1 electric furnace, with annual capacity of 85,000 tons of ingots; 1 plate, hot strip and cold strip mill with annual capacity of all products, approximately 600,000 tons; 1 hot dip tin mill, annual capacity 90,000 tons, also included in total capacity of plate and strip mills.

The foregoing are the major items and, of course, there have been a number of lesser improvements and additions too numerous to mention and itemize.

"We have plans to further increase our coke, pig iron and ingots capacity in the near future if conditions surrounding heavy construction are favorable," Mr. Hilton stated.

Freight Car Outlook In Germany Seen Brighter

Washington

••• Aided by the Economic Cooperation Administration, sufficient freight cars are expected to be available within 2 years to meet normal service demands of Bizone Germany. Under the current program, German freight car builders are expected to have

reached a production rate of 30,000 cars annually by the end of next year.

Even now, an ECA report says, German plants are working on production of 3000 cars to be delivered by the end of 1948. Another 12,000 will be rolling by next July.

This optimistic outlook is based upon a first-hand survey made by William White, president of the Delaware, Lackawanna & Western Railroad, who is serving as transportation consultant to the ECA.

In the meantime, ECA has approved a \$74 million program for freight cars for Bizonia and the French zone. Of the total, \$60 million worth will go to the bizone.

At the present time, the White report says, a third of the bizone freight cars are more than 35 years old and another 27 pct are unserviceable. Despite this fact, the report says about 85 pct of demand is being met and little difficulty is met in getting coal out of the Ruhr.

It is also estimated that the bizonal railroads are at least 5 years behind in rail maintenance.

McLouth Steel Co. Spends \$18.5 Million on Expansion

Detroit

••• McLouth Steel Co. is undertaking a major expansion program which will eventually more than double its present capacity, according to Donald B. McLouth, president of the company.

The program is basically designed to completely integrate present facilities so that the company will no longer depend solely upon large steel producers for its raw materials.

Because of the substantial disparity between the demand for steel products in this area and the existing local steel capacity, there has been a need for another integrated steel mill in Detroit. This fact in addition to the difficulty McLouth has had in getting semi-finished steel was instrumental in making the decision to undertake the current program.

The company has purchased a 210-acre tract of land at Trenton on the Detroit deep-water channel which contains all the prerequisites for a completely integrated mill. The plant which is being built on

this site will consist of electric furnaces, soaking pits, a blooming mill and finishing mills.

A new electric furnace ingot plant at Indiana Harbor, Ind., has been purchased from the WAA and is being dismantled and moved to Trenton. When this relocation and additional construction is completed, McLouth will have four 60-ton electric furnaces with a combined melting capacity of approximately 30,000 tons of carbon steel ingots per month.

Melting operations there are scheduled to begin in January and the complete plant will be at capacity operation by the middle of next year. New investment in this program is expected to run about \$18.5 million.

Negotiations are being completed at the present time with competent scrap dealers to assure an adequate supply of raw materials for the electric furnaces so that the company will be able to operate the furnace at peak capacity as soon as they are ready to operate.

Weekly Gallup Polls . . .

Survey Expert Answers Questions Most Often Asked

inceton, N. J.

• • • "Why haven't I been interviewed? Why have I never heard anyone who has been interviewed?"

These questions come up more frequently than any others that people ask about modern public opinion surveys, according to George Gallup, director, American Institute of Public Opinion.

Old-fashioned "straw polls" relied almost entirely for their accuracy on *numbers*. Modern polls rely for their accuracy on an entirely different principle—the careful selection of a *small but representative cross-section*. When an engineer wishes to judge the quality of ore in a mine, he examines a few "samples." From these he makes a highly accurate estimate of the amount and quality of ore in the mine.

Similarly, samples chosen to represent public opinion provide a truthful picture of the total electorate. It is of little consequence whether this image is life-size or whether it is reduced to a fraction of the original, just as a photograph can be reduced in size and still remain a truthful and accurate portrait.

No case has yet been recorded of a nation-wide poll which has gone long because too few persons are interviewed. Suppose a poll any given week covers a total of 3000 persons. The chances of being interviewed that week are, then 1 in 30 out of about 94,000,000, the number of adults in the country, or a chance in 31,333.

With a sample of 3000 taken weekly, a total of 156,000 persons could be reached in a year, or less than one pct of the total adult population. Since the average life expectancy of a person reaching the age of 21 is about 50 years, this means that the average person would have less than one chance in 1500 of ever being interviewed in his lifetime, with samples based upon an average of 3000 per week.

•
How do you select the people to be interviewed?"

In the first place the sample, or

national cross-section, must include the right proportion of citizens from every walk of life. This means that a careful study must be made of the population structure. By and large, the most important factors which have to be considered are occupational groups, income levels, political preferences, age, education, racial and religious groups. And these major groups must be represented correctly by cities of various sizes, and by rural areas. On occasion, other factors may be found to be important. On some issues which involve labor unions it may be important to test the sample to see that it contains the right number of union members.

By examining government data and election figures information on these, major "controls" can readily be obtained. When all the facts regarding the basic population structure of a city or of a nation are known, the job of laying out a sample is not difficult. For example, if 20 pct of the adults of the nation are engaged in farming, then obviously 20 pct of the total sample for the nation must consist of farmers. If 20 pct of all of the adults of the country are between the ages of 21 and 29 years of age, then 20 pct of the total sample must come from this group.

•
"Who are the interviewers? How are they chosen?"

Most interviewers for the institute have attended college. Since interviewing requires only part of their time, nearly all have some full-time occupation. Interviewers are selected on the recommendation of educators, lawyers, and others in responsible positions who know them personally and believe they meet the necessary requirements.

The interviewer must be conscientious, alert, open-minded, well acquainted with the community in which he interviews. He must carry out his assignment exactly as planned and preserve the attitude of complete objectivity.

•
"How does an interviewer go about his work?"

An interviewer is sent an assignment asking him to interview a number of people, usually between 10 and 25. He is told to interview a certain number in each of four socio-economic groups in his community, how many men to interview, how many women, how many persons in each income level, how many farmers, if any, and so forth.

The interviewer obtains and records many facts about the person interviewed, including his occupation, general income level, age, educational attainment, whether he has a telephone, an automobile, and how he voted in the last national election. Information such as this is important in making sure that the sample from each area meets all the requirements of the cross-section.

Interviewers are not required to get names of persons they interview on regular assignments, because it is known that people express their true opinions more freely if they remain anonymous.

•
"How useful are the polls?"

Most people know about public opinion polls because of the election predictions. But scientific polling has made many valuable contributions to our democratic process over and above election forecasts. Some of them are:

(1) Provide leaders with a more accurate gauge of public opinion. (2) Clearly demonstrate that the common people arrive at sound judgment on scores of problems. (3) Help focus attention on major issues. (4) Uncover many "areas" of ignorance; bring out weaknesses in our educational system, and point up shortcomings in the process of keeping the public well-informed on vital issues. (5) Help government administrators make wiser decisions. (6) Make it more difficult for political bosses to pick presidential candidates in "smoke-filled rooms." (7) Constitute almost the only present check on pressure groups.

50 YEARS AGO

THE IRON AGE, October 26, 1898

• "That there is a great future before the steam turbine, no one now doubts. The advantages of the turbine over the ordinary marine engine are so pronounced that many engineers do not hesitate to describe it as one of the leading inventions of the century which is destined to revolutionize marine propulsion and inaugurate a complete change in the shipbuilding and shipping trades—a change that may be as great as the substitution of steam for sail shipping."

• "Elbert H. Gary, president of the Federal Steel Co., has returned from New York to Chicago after transferring the stock of the Illinois Steel, Minnesota Iron, and Elgin, Joliet & Eastern R.R. companies to the new corporation."

• "Vessel men on the Great Lakes are enjoying the novel sensation of being sought after instead of seeking customers. This condition is partly due to the great tonnage of iron ore to be transported this year."

• In the rapid development of the art of founding, one point seems to have escaped general research. This is the question of melting and casting temperature, a question all foundrymen deal with daily and which for some branches of the art, means a successful cast or an utter failure."

• "The Marconi system of wireless telegraphy was recently demonstrated in the House of Commons at London. A number of messages were sent and received from the other side of the Thames. Other tests made recently prove it has commercial value."

• "The old topic of the displacement of a railroad track due to rotation of the earth on its axis has been proven false in a recent study. There appears to be no appreciable danger from this cause, and where the rails have moved it must be charged to other causes than side pressure due to rotation of the earth."

• • • Fabricated steel awards this week included the following:

- 625 Tons, Williamsport, Pa., Divine Providence Hospital, to Lehigh Structural Steel Co., Allentown, Pa.
- 265 Tons, Baltimore, Pennsylvania R.R. extension to pier No. 1, to Pittsburgh Bridge & Iron Works, Pittsburgh.
- 175 Tons, Philadelphia, factory building, R. C. Weldon, Philadelphia, to Bethlehem Steel Co., Bethlehem.
- 105 Tons, Palmyra, N. J., American Legion building, to Anthracite Bridge Co., Scranton, Pa.

• • • Fabricated steel inquiries this week included the following:

- 2000 Tons, Edgmoor, Del., building for Delaware Power & Light Co., Nov. 8.
- 307 Tons, Teton Co., Wyo., Star Valley-Yellowstone bridge, Public Roads Administration, Denver, bids to Nov. 4.
- 225 Tons, Schuylkill County, Pa., I-beam bridge for Pennsylvania Dept. of Highways, due Oct. 29.
- 210 Tons, Niobrara Co., Wyo., bridge over Cheyenne River on Newcastle-Lusk road, State Highway Commission, Cheyenne, bids to Oct. 29.
- 204 Tons, Clark Co., Nev., Charleston Blvd. underpass, Las Vegas, Director of Dept. of Highways, Carson City, bids to Nov. 9.
- 150 Tons, Lackawanna County, Pa., I-beam bridge for Pennsylvania Dept. of Highways, due Oct. 29.

• • • Reinforcing bar awards this week included the following:

- 1000 Tons, Eldridge, Calif., Sonoma State Home, ward building and tuberculosis hospital, through Haas & Rothschild, San Francisco, to Ceco Steel Products Corp.
- 305 Tons, Chicago, warehouse for Illinois Bell Telephone through W. E. O'Neil Contracting Co. to Jos. T. Ryerson & Son, Inc., Chicago.
- 260 Tons, Evanston, Ill., Evanston hospital previously reported awarded to R. C. Wieboldt Co., bars will be supplied by J. T. Ryerson & Son, Chicago.
- 185 Tons, Peoria, Ill., power house for state hospital through S. N. Nielson & Son, to Laclede Steel Co., St. Louis.

• • • Reinforcing bar inquiries this week included the following:

- 270 Tons, Chicago, psychiatric building for Michael Reese Hospital.
- 180 Tons, Chicago, press and bindery building for Cuneo Press.
- 120 Tons, Sutter Co., Calif., bridge over Cross Canal, near Nicholas, California Div. of Highways, Sacramento, bids to Nov. 17.
- 105 Tons, Wheeling, Ill., convent building.
- 100 Tons, Chicago, warehouse for Time, Inc.
- 100 Tons, East Boston, Mass., storm drainage system, General Logan Airport.

• • • Plate awards this week included the following:

- 1000 Tons, Eddystone, Pa., scroll casings for Baldwin Locomotive Co., to Bethlehem Steel Co., Bethlehem.

• • • Railroad car awards and inquiries this week included the following:

- Southern Pacific Lines has placed an order for 5000 tons of 113-lb rail with the Tennessee Coal, Iron & Railroad Co., Birmingham, delivery to begin next spring.
- The Missouri, Kansas & Texas Railroad has ordered 500 70-ton hopper cars from Pressed Steel Car Co. to be built in the latter's Mt. Vernon, Ill. shops for delivery in April and May, 1949.

Construction Steel . . .

New York

• • • The estimated total bookings of fabricated structural steel for the month of September, according to reports received by the American Institute of Steel Construction, Inc., were 174,671 tons, an increase of 5 pct over the previous month, and 30 pct greater than for September, 1947. Bookings for the nine months have totaled 1,477,493 tons, compared with 1,192,605 tons for the first nine months of 1947.

Shipments were slightly lower than for the previous month. Total shipments for the first nine months of the year amounted to 1,448,938 tons, an increase of 77,901 tons over the corresponding period of 1947.

The backlog (tonnage available for future fabrication) for the

next four months only has increased to 698,230 tons.

Following is the complete tabulation of bookings and shipments:

Estimated Total Tonnage for the Entire Industry			
Contracts Closed	1948	1947	Average 1936/1940
January	160,634	104,973	107,578
February	130,119	125,881	96,280
March	213,123	149,634	124,558
April	154,082	161,338	110,783
May	141,764	112,954	126,237
June	162,367	103,273	125,835
July	174,682*	153,540	152,481
August	166,051*	146,382	113,135
September ..	174,671	134,630	137,982
Totals ...	1,477,493	1,192,605	1,094,869
Shipments			
January	146,363	140,650	92,578
February	141,556	136,126	88,626
March	167,029	137,799	115,031
April	166,687	157,392	123,650
May	186,915	154,980	123,225
June	157,109	151,882	129,969
July	157,264*	169,911	127,422
August	167,174*	157,952	136,389
September ..	158,841	164,345	137,255
Totals ...	1,448,938	1,371,037	1,074,145
Tonnage Available for fabrication within the next 4 months ...			

* Revised

Pig Iron Shortage Expected to Extend Through First of 1949

Philadelphia

• • The gray iron foundries have been in desperate need of pig iron since the end of the war and there is very little cause for optimism as to the prospects during the early part of 1949. However, merchant furnace relinings will have been completed by the end of the year and they should all be in full production. Imports of foreign iron have been growing and prices have been coming down.

The underlying causes of the merchant iron shortage since the end of the war were ably presented by John Claussen of the American Iron & Steel Institute at the recent meeting of the Gray Iron Founders' Society at Atlantic City. He sees the principal factor a shortage of merchant capacity caused by high furnace construction costs and widely fluctuating demand for merchant iron.

The cost of wartime construction of blast furnace and complementary coke oven capacity has been reported by the War Production Board at \$25 million for 1000 ton a day capacity, moderate plant even judged by today's standards. High current construction costs could boost this figure.

The merchant iron market is very unstable. It fluctuates from feast to famine. Extremes in demand are seen in the years of 1929 and 1932. Foundry and malleable iron produced for sale in 1929 approached 4 million net tons. Three years later it dropped to 1.3 million. Production in 1937 was 4.8 million, but a year later it dropped to half that figure.

Interest on investment, maintenance and other costs accruing while an expensive plant remains idle for years at a time constitutes a very poor investment. About 19 merchant furnaces have been dismantled or abandoned since 1936. Iron buyers are prone to speak hopefully now of these deceased furnaces and sometimes wonder whether they were wise to turn away their salesmen in favor of local producers' iron and lower priced foreign iron.

Imports of pig iron are growing in volume according to Dept. of Commerce statistics. Imports are coming in at the rate of 13,000 to 15,000 gross tons a month, compared with an average of 8000 tons

Merchant Furnace Relinings Are Scheduled to Be Done By End of This Year

By JOHN ANTHONY
Eastern Regional Editor

a month during the first half of the year. Offerings give buyers the impression that the available tonnage is unlimited. But it is quite evident that there is a considerable duplication of offers for firm tonnages.

Resistance to the high import prices has grown rapidly with the completion of merchant furnace repairs. Prices have come down and it is possible that they may reach even lower levels. Sales agents are now asking for offers to submit to their foreign principals. Pipe foundries say that they are now buying foreign iron at prices not much higher than the prices of cast scrap. This iron is off-grade, true of much of the imports, although high grade standard analyses are also being offered here at lower prices. Foreign governments do not permit the export of standard grades of iron, but some foreign producers, hungry for dollars, are stretching the point in order to sell iron here.

Indian iron in standard grades from basic to No. 2 foundry is offered by a West Coast agent for delivery c.i.f. eastern ports at \$72 to \$76 a ton, the lowest price so far learned of for high grade foreign

iron. Some 10,000 tons are available. Dutch iron is offered by an eastern agent at \$75 a ton.

The doubling of the capacity of a number of production foundries since the end of the war has also been a factor in the iron shortages. Gray iron casting shipments reached 6.4 million tons in the first half of the year, higher on an annual basis than the peak year of 1947. Yet shipments of foundry and malleable iron dropped to 2.4 million net tons in the first half of 1948, a decline of 245,000 tons from the same period of last year.

Some market factors believe that the lower prices of foreign iron may act to curtail imports next year. It is reported that equally high prices can be had from foreign consumers, but not in dollar exchange.

New England consumers, hard hit by the 3-month Mystic furnace shutdown, will begin to receive shipments from Everett about the middle of November. Blowing in of the furnace will begin about Nov. 1. While this furnace was down it was the practice of some foreign iron sales agents to tell customers that the furnace would not get into production until the first of the year.

The Woodward Iron Co. furnace, down since Oct. 1, will be back in production by Nov. 1, after an estimated loss of 2000 tons of iron. The old Chester furnace being reconditioned by Brassert & Co. for the Brown Engineering Co. of Houston, is expected to begin production on Nov. 11. This iron, however, will not be offered to the trade.

Coming Events

- Oct. 25-29 National Metal Exposition, Philadelphia.
- Oct. 28-29 Porcelain Enamel Institute, sales and management conference, Chicago.
- Nov. 3-5 American Society of Body Engineers, annual convention, Detroit.
- Nov. 4-5 Society of Automotive Engineers, fuels and lubricants meeting, Tulsa, Okla.
- Nov. 4-6 National Electronics Conference, Chicago.
- Nov. 14-17 National Tool & Die Manufacturers Assn., annual meeting, Milwaukee.
- Nov. 18-19 National Founders Assn., annual meeting, Chicago.
- Nov. 28-Dec. 3 American Society of Mechanical Engineers, annual meeting, New York.
- Dec. 2-4 Society for Experimental Stress Analysis, annual meeting, New York.
- Dec. 6-8 Electric Welding Conference, Detroit.

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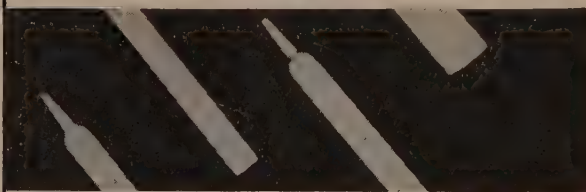
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Made with straight, tapered and double reduced self-cooling ends.



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H. B. Campbell Retires After 44 Years Service

Pittsburgh

• • • Herman B. Campbell, vice-president in charge of operations of Harbison-Walker Refractories Co., has retired after 44 years service with the company. Mr. Campbell is known throughout the refractories industry for his contribution of the dry grinding process in the manufacture of silica brick.



H. B. Campbell

He became associated with Harbison-Walker in 1904 at the Portsmouth, Ohio, plant, and soon was appointed district superintendent of the Ohio and Kentucky districts. In 1910 his jurisdiction was expanded to include the Alabama works.

He came to Pittsburgh in 1922 to join the works and mines department with which he served as department head, and since 1939, as operating vice-president.

Koppers Co., Inc., Expands Wood Preserving Plant

Charleston, S. C.

• • • The Koppers Co., Inc., with general office in Pittsburgh, has virtually completed a program of improvement to its Charleston, S. C. wood preserving plant.

R. M. Killey, district manager for the Koppers wood preserving division, and H. E. Howard, plant superintendent, said that the modernization and expansion program, which is being carried out at a cost of a quarter million dollars, equips the plant for efficiently treating all varieties of forest products with all standard pressures and preservatives.

The Koppers Improvements include the most modern types of machinery; improved docking facilities, from which ocean-going vessels can load and unload; new tanks for the storage of preservatives; 50 new KVA transformers; 65 new tram cars; an improved method of handling wood wastes; and a complete revision of the facilities for adzing and boring ties.

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Westinghouse to Hold Its Second Materials Handling Conference

Pittsburgh

• • The second Materials Handling Conference sponsored by Westinghouse will be held in Buffalo, on Nov. 8-9. The first day's session will convene in the Niagara Room of the Hotel Statler; the second day's session in the auditorium of the Westinghouse Buffalo plant.

The morning program will open with "A User's Eye View of the Materials Handling Industry" by E. L. Bailey of Chrysler Corp., Detroit. He will be followed by D. E. Akins, of the Westinghouse International Co., who will discuss "The Export Market."

R. C. Sollenberger, executive secretary of the Conveyor Equipment Manufacturers Assn., will act as chairman for the rest of the morning program, which will cover electrical problems in the conveyor industry with papers by Stanley Smith of Mathews Conveyor Co., Ellwood City, Pa., and J. J. Bishop of Mechanical Handling Systems, Inc., Detroit.

The first half of the afternoon program will be under the chairmanship of W. W. Peattie of Northern Engineering Co., who is head of the Electric Overhead Crane Institute. C. Brongersma of Haw Box, Muskegon, Mich., will present a paper on "Standardization of Motors and Control for Cranes." This will be followed by a paper on "What Can Be Done for the Operator" by E. C. Rice of Whiting Corp., Harvey, Ill.

The balance of the afternoon program will include three papers of general interest. E. M. Hays of Cravo Corp., Pittsburgh, will discuss "Safety Codes for Materials Handling Machinery." Following this will be a paper on "Bauxite Handling with Adjustable Voltage" by H. G. Dillon of Heyl & Patterson, Pittsburgh. Mr. M. P. Winther of Dynamatic Corp., Kenosha, Wis., will end the first day's session with a presentation on "Adjustable Speed Drives for Materials Handling Machinery."

The morning of the second day will be devoted to brief discussions of Westinghouse products for the materials handling industry. An exhibit of electrical equip-

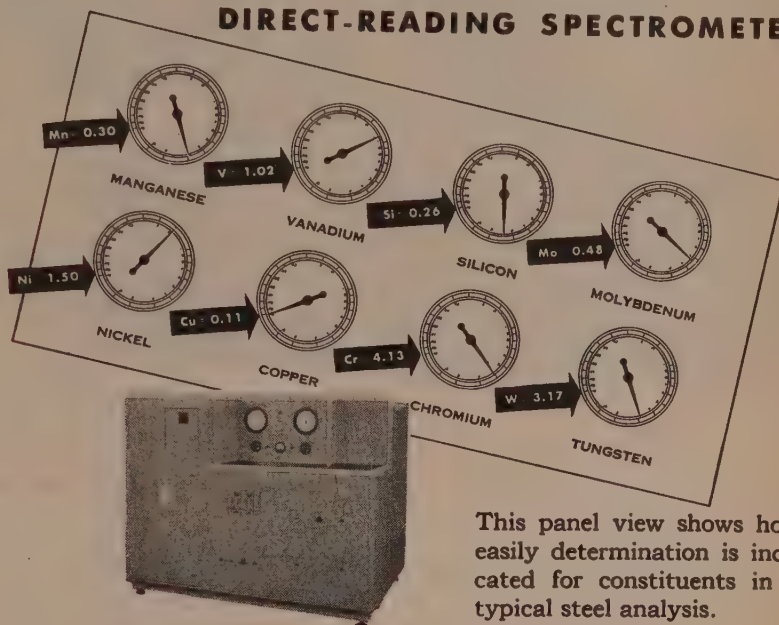
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Production control analysis, for the desired constituents, is obtained within 40 seconds after the operator has pushed the button that initiates the automatic analyzing cycle. The analysis requires no photographic darkroom, no specialized operating techniques, and no reading of graphs.

Precision of analytical determinations is equal or superior to that of present photographic means using conventional spectrographs.

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Other special apparatus produced by Baird Associates, Inc. over the past decade include spectrographs, spectrographic power sources, density balances, infra-red spectrophotometers, microphotometers, infra-red gas analyzers, and Rayleigh interferometers.

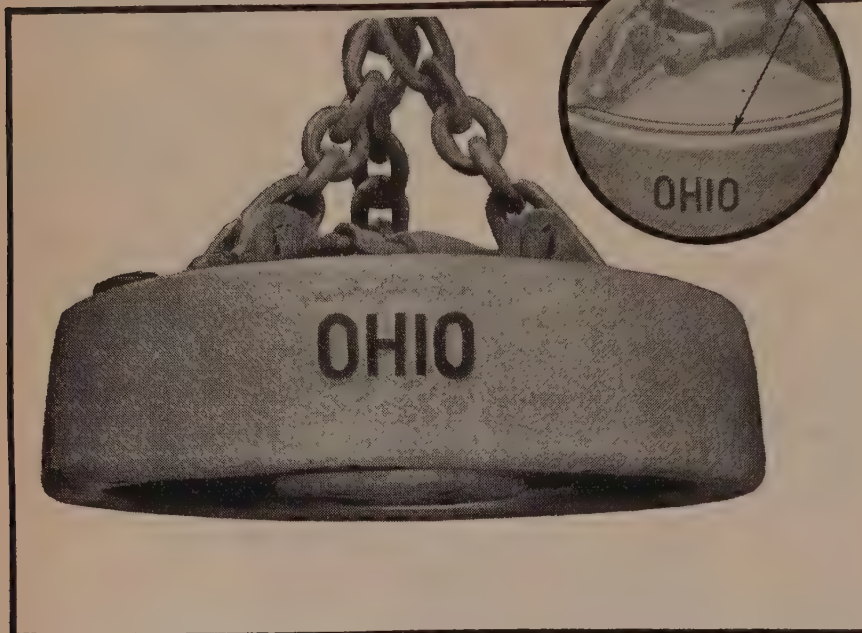
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ment will supplement the discussions. The afternoon will be taken up by a tour through the various manufacturing sections of the plant. An open forum discussion panel for covering any questions or problems of general interest will bring the conference to a close.

Engineers Attend Oil Company Open House

Cleveland

• • • More than 200 engineers and plant superintendents were present at an open house and tour given Oct. 1 at the Cleveland plant of Brooks Oil Co., according to Fred McCurdy, president. The plant showing marked completion of an expansion program that has more than doubled production capacity. This makes Brooks the world's largest independent compounder of specialized industrial lubricants, according to Mr. McCurdy.

Among the equipment additions are a complete series of tanks, and an automatic drum-filling device which allows only a predetermined weight of material to flow into the drum. This not only eliminates costly and time-consuming weighing procedure, but also greatly simplifies recording and bookkeeping.

The laboratory facilities have also been enlarged and modernized and now contain equipment and facilities ordinarily found only in the largest research laboratories, the company said. Plans for the future include the addition of storage space for product aging and the modernization of boiler plants.

Receives New Honor

Cleveland

• • • Raymond L. Collier, executive vice-president, Gray Iron Founders' Society, Inc., was elected a director of American Trade Assn. Executives, national professional organization of trade association managers, at the annual meeting of ATAIE in Chicago.

Mr. Collier has spent 22 years in trade association work, having been affiliated with national associations of lighting fixture manufacturers, steel foundries and, for the past 1½ years, with gray iron foundries.

British Demonstrate Importance of Scrap Return to Industry

London

• • That steel scrap salvage on the largest possible scale is essential to the national economy was emphasized from an unusual angle at the British Assn. meeting in Brighton in September.

Professor Bernal led a discussion by the Chemical Section on the conservation of chemical elements, during the course of which R. M. W. Thring, of the British Iron and Steel Research Assn., demonstrated the chart herewith. The chart relates to the year 1935 (selected as a year after the slump and before the war) and shows in thousands of tons the flow of Fe through and back into the British iron and steel industry, the purpose being to examine the flow for stoppable leaks.

The blast-furnace reduction of iron ore, at the average expense of 360 lb of coal per 2240 lb of pig-iron, is the only means of putting new Fe into circulation, and any conservation of Fe will clearly reduce the need for this expensive, inefficient, process.

Examination of the chart shows, however, that in its manufacturing processes the iron and steel industry itself has no remediable leakages. The blast furnace in fact recovers over 99 pct of the Fe and into it in any form. The only considerable loss of Fe is in open-earth slag and Bessemer blowing gases, which account for about 6 pct of the total, i.e., 600,000 tons. It would be possible to recover much of this Fe in the blast furnace, but only at the expense of vast quantities of coke. This leaves the recirculation of scrap as the only feasible method of stopping a leak.

Recovery of scrap from the iron and steel industry is very high indeed and there is no measurable difference between the amount of scrap made in the industry and the amount which is recirculated in the steel furnaces. This does not mean, of course, that there is room for improvement in reduction of the amount of scrap made, but that such improvement would not affect the Fe balance at all. It would only increase the amount of steel available to gen-



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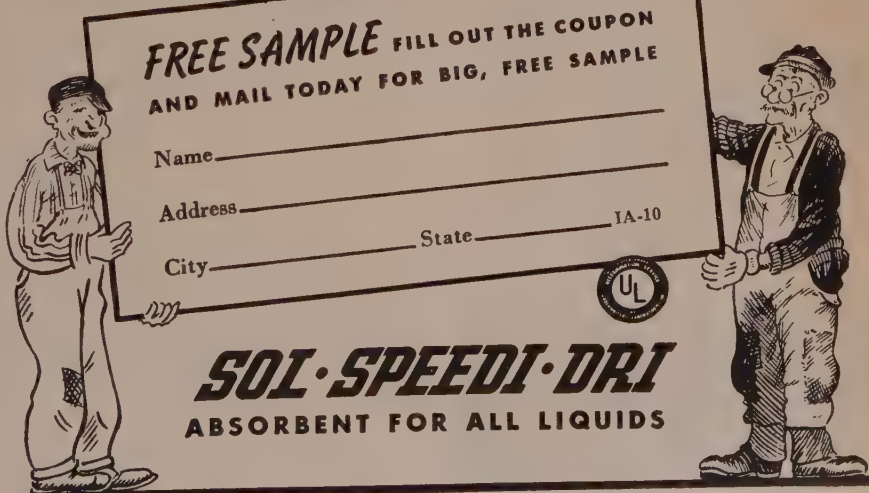
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NEWS OF INDUSTRY

eral industry from a given furnace capacity.

On the other hand, scrap recovery from industry and consumer could and must be improved. In the case illustrated nearly 7 million tons of steel goes to industry and only 3.8 million tons are returned.

The chemical argument thus reinforces the economic argument for the drive for scrap and Professor Bernal himself underlined its importance.

Comparable figures of actual scrap collected in Britain during the first half of 1948 (figures in thousands of gross tons) are:

(a) Steel delivered to industry	5642
(b) Scrap recovered from industry	2300
Proportion of (b) to (a)	41 pct
Comparable proportion in 1935	51 pct

Present conditions are not really comparable with those of 1935, and the proportion now collected is in fact very creditable. But it is nevertheless a fact that the United Kingdom is using 35,000 tons per week more scrap now than it did this time last year, and is dependent on imported supplies to avoid seriously depleting stocks.

Presents Paper at Meeting Youngstown

••• Dr. Karl L. Feters, who is a special metallurgical engineer for the Youngstown Sheet & Tube Co., will present a paper entitled the "Distribution of Nonmetallic Inclusions in Some Killed Alloy Steel Ingots" before the National Metal Congress of the American Society for Metals at Philadelphia on Oct. 26.

The paper which is coauthored by Mrs. Martha Helzel and Joseph Spretnak of the Carnegie Tech Metals Research Laboratory is based on wartime studies at Carnegie.

Investigation was on bore defects in seamless gun tubes and the method was developed to speed the manufacture of guns for war use.

At the time of the investigation, Dr. Feters was assistant professor of metallurgy and a member of the Metals Research Laboratory staff at Carnegie.

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"You may be interested also to know that these magnets will replace other types magnets manufactured by other concerns."

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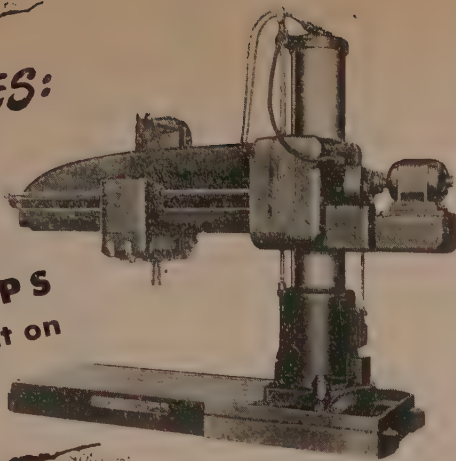


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 The Carlton Machine Tool Company
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Illustrated above is a Carlton Radial Drill equipped with a Model UL Immersed type Gusher Coolant Pump.



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Allocations Seen Curbed By Fear of Too Much

Washington

• • • Steel-starved industrialists who may have felt that the voluntary allocations program would eventually affect all distribution of steel played a large part in the decision of the steel industry to call a halt to new allocation agreements.

Applications for voluntary programs from industries and individual firms were beginning to skyrocket and it appeared that the steel industry would soon be asked to underwrite what amounted to complete priorities. Neither the steel industry nor Commerce Dept. intended to go that far, since the law was not that broad and the termination date was too near at hand. Not generally known is the fact that literally hundreds of requests for programs never reached the steel industry but were blocked some place in the Commerce Dept.

Included among these industries are the following: Frog and switch, locomotives, tanks, trucks, auto bodies, truck trailers, tobacco curing, water pumps, Hawaiian sugar planters, and dozens of others, as well as scores of individual companies.

A Commerce Dept. official remarked rather sarcastically to THE IRON AGE, "Industry screams about controls, but here we try to set up a few essential programs, and before we know it, we are swamped with requests which, if granted, might repeat WPB all over again."

Receive Manuscript Award

Cleveland

• • • The trustees of the James F. Lincoln Arc Welding Foundation have announced a joint award of \$5000 to Professor C. D. Williams of the University of Florida, Gainesville, Fla., and to Professor E. C. Harris of Fenn College, Cleveland, for their coauthorship of a textbook manuscript in the foundation's Textbook Award Program. The Program's Jury of Award selected their manuscript entitled, "Structural Design in Metals," as the best modern textbook manuscript in the structural engineering field.

The Irwin-Farnham Publishing Co. of Chicago will publish the new textbook which will be ready for distribution soon after the first of the year.

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New fact program helps
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GENERAL ELECTRIC

Objective of Capehart Committee to Clarify Confusion on Pricing

Asheville, N. C.

• • • "The Objectives of the Capehart Committee" was the title of a thought provoking speech by William Simon, general counsel of the committee, before the semi-annual meeting of the Concrete Reinforcing Steel Institute here recently.

The members were much confused by what Mr. Simon said concerning f.o.b. mill prices, non-discriminatory mill net, conspiracy, price fixing, etc. This was expected as the speaker declared, "The members of FTC itself are in thorough disagreement as to the nature and effect of the decision."

However, when Mr. Simon explained that non-discriminatory mill nets and the whole philosophy of FTC program is based on the theory of indifference—the members threw up their hands, raised their voices and otherwise vented their feeling. The group wanted to know "How can we do business on such a basis? How can we be indifferent to a competitor's price? And what pricing system can we use?"

Mr. Simon told the meeting that these are the \$64 questions which have not been satisfactorily answered as yet. He emphasized that his committee needs evidence if they are going to persuade congress to rectify the present law. He asked that the group not just write in and say that f.o.b. mill prices are wrong, but rather to lay out on paper to the committee specific details on how much more their steel costs are at present, and if members of the institute are forced to move their plants they should specifically enumerate all the facts as to why. Only with such concrete evidence can the committee hope to induce congress to act, the speaker said.

The institute members were not confused by the objectives of the Capehart committee. Mr. Simon clearly outlined the committee's aim, "The primary function of this committee is to clarify the confusion now existing as to what pricing practices are illegal." He reminded the group that the FTC takes the view that whenever a

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seller receives varying mill net prices he discriminates in price.

"It is not possible to have uniform national delivered price, the uniform zone price, or systematic freight absorption to meet competitors' lower prices without having varying mill nets." Therefore, as the law now stands, the speaker declared, the FTC may declare illegal any pricing system resulting in varying mill nets which it finds has a "reasonable possibility" of injury to competition.

The speaker reviewed the cement case and explained that although the Supreme Court was of the opinion that the cement companies had pursued the basing point system by agreement, it expressly said that a finding of conspiracy or agreement was not essential for the commission to find the use of a basing point system to be an unfair method of competition.

Mr. Simon related that when the cement case reached the Supreme Court the commission advanced many economic and legal theories extending beyond the issues raised by its order of cease and desist to the cement industry. He pointed out that many of these pure theories were adopted by the court in its opinion and that by this action the court went beyond its authority.

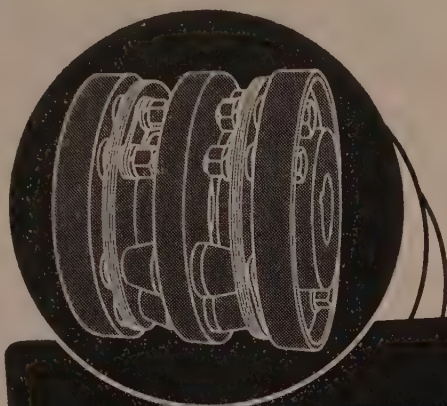
Mr. Simon told the gathering that on three occasions congress has expressly declined to pass legislation that would have outlawed uniform delivered pricing and freight absorption. The first occasion was in 1936 when Senator Wheeler introduced a bill for the avowed purpose of outlawing uniform delivered prices and basing point systems. The second case was when the Robinson-Patman Act was passed in 1936. As originally introduced in congress, and as recommended by the FTC, that act defined "price" as a seller's mill net. Congress refused to pass the bill in that form. The definition of price was stricken from the act before it was passed by Congress.

Mr. Simon went on to relate that the third occasion occurred in 1940 when the TNEC recommended legislation outlawing the basing point system. Again congress declined to pass such legislation. "It would seem that congress can no longer avoid responsibility on this important issue. While

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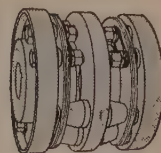
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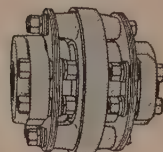
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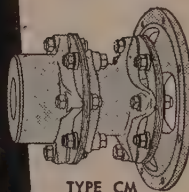
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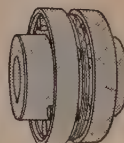
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TYPE DSM



TYPE CM



TYPE ST

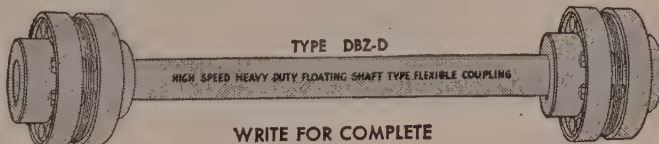


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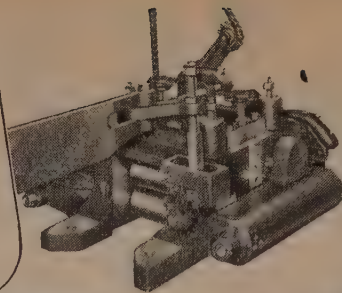
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214 PLATES TO BE PUNCHED,
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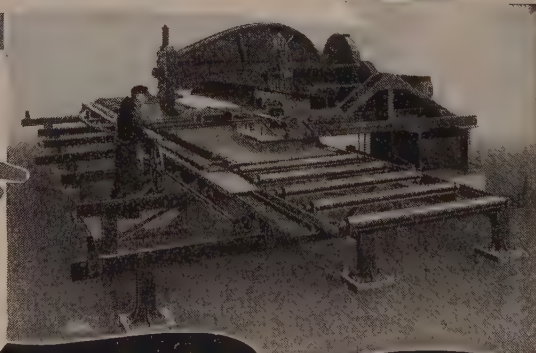
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PITTSBURGH, 23, PA.

it is for the court to construe the laws, it is for congress to determine what is best for the national economy and put it into law," the speaker declared.

At the conclusion of the meeting the president of the institute, Herbert D. Calves, appointed a committee to ascertain exact feelings of each and every member of the group and to take specific action. The chairman of this committee, Blair M. Boisseau, will determine the institute's opinion and make specific each member's objection. This information will be submitted to the Capehart Committee for their use in coming to a decision and in recommending specific action to the next congress.

Lorraine Strike Ends; Loan, Wage Hike Given

Paris

• • • A 3-week-old strike of workers in the steel mills of Lorraine terminated recently with workers getting a 10 pct wage increase. Agreement was reached through a joint committee of arbitration. In this agreement the Government made wide concessions to the workers whose committees were expected to endorse details of the settlement without further ado.

Terms of the agreement also call for a worker loan of 2500 francs, roughly \$11.50, to be paid back at the rate of 500 francs a month from the second half of 1949.

The settlement of the Lorraine strike is an important success for the Government, if the workers accept it. This is true because some of the violence of the steel strike spread into the coal miner's strike which had previously been progressing rather quietly.

Aside from the coal strike whose effects are beginning to be felt throughout the industry, the question of prices was the most serious problem confronting the Government. In this connection many believe that the new price for coal is too high and that it will effect both wages and prices of manufactured goods.

The Government view is that the rise was vital to avoid recourse to a Government subsidy for coal.

New Welding Electrode Specifications

(CONTINUED FROM PAGE 73)

strength of all aluminum bronze types, and have relatively high hardness. They are particularly suited to bearing overlays where resistance to high unit loadings against hardened steel or where wear is involved. They are also used for joining aluminum bronze of similar analysis.

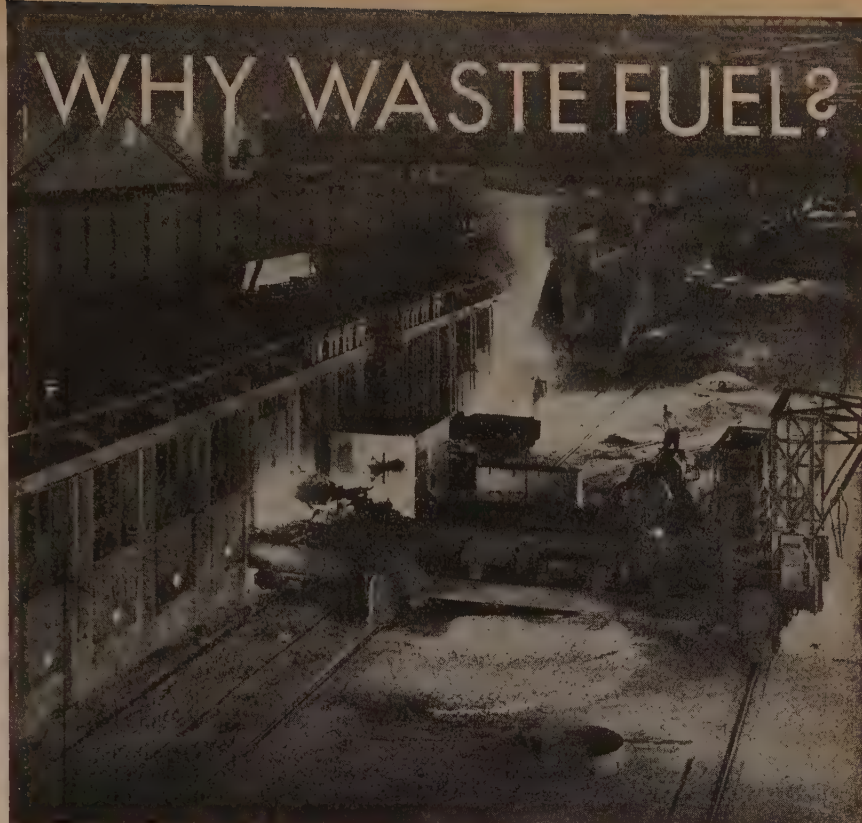
The E CuAl-D types are used for applications similar to those for which the E CuAl-C electrodes are used. The weld metal is lower in tensile strength and ductility but higher in hardness.

Electrodes of the E CuAl-E classification yield weld metal having the highest hardness obtainable with the aluminum bronze electrodes covered by the specs. It has excellent bearing qualities and these electrodes are often used for surfacing on forming and drawing dies and items subjected to similar service. They are also used in joining aluminum bronze parts of similar analysis.

Revisions of the specifications for mild steel electrodes have resulted in the addition of E6015, an all position, dc, reversed polarity only, electrode and E6016, an all position, ac and dc, reversed polarity, electrode. These electrodes have a covering of the carbonate of soda and lime type, with other compounds low in hydrogen. Many new high tensile steels contemplated for future production will require the use of E6015 and E6016 electrodes. Another use is in the welding of high sulfur steels. The E6016 electrode coating is similar to that on the E6015 except for the use of potassium silicate or other potassium salts to facilitate its use on ac.

Table III shows the electrode classifications for mild steel welding along with the type of coating, welding positions, current and the mechanical properties—tensile and yield strength and elongation—for deposited metal in the as-welded or on-stress-relieved condition.

The new specifications for corrosion resisting steel welding electrodes include the addition of four new series of classifications, the E309, E317, E330, and E410 series, with four electrodes in each series. The usability characteristics of these electrodes, chemical and mechanical properties of all-weld metal, and color marking requirements are shown in table IV.



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Therm-O-flake INSULATIONS are designed to reduce heat losses and seal furnace walls against cold air infiltration. These are used regularly on hundreds of open hearth furnaces and save steel producers thousands of fuel dollars daily.

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open hearth Insulation

Ford Balance Sheet

Detroit

• • • One of the more interesting pasttimes in Detroit is guessing the earnings of the Ford Motor Co. on the basis of its annual report which is filed with the Massachusetts State Tax Commissioner at Boston. The following show important changes in the Ford balance sheet during the year 1947.

According to the report, Ford Motor Co held assets valued at \$1,025,733 on Dec. 31, 1947. Liquid assets, including cash and securities totaled \$402,105,000 compared with \$389,738,000 a year earlier. Ford surplus is shown at \$732,019,000 at Dec. 31, 1947 compared with \$683,162,000 a year ago.

Assets	Change during 1947 (000)	Dec. 31 1947 (000)
Cash, accounts and notes receivable, securities and patent rights . . .	+ 12,367	402,105
Real estate, machinery, equipment, tools, furniture and fixtures . . .	+ 90,240	386,183
Merchandise and supplies . . .	+ 51,717	231,534
Prepaid expenses and deferred charges . . .	- 8,638	5,911
Total Assets . . .	\$+145,686	\$1,025,733
Liabilities, Reserves and Capital		
Current liabilities . . .	+ 87,384	256,202
Reserves . . .	+ 9,445	20,247
Capital stock . . .	-	17,265
Surplus . . .	+ 48,847	732,019
	\$+145,686	\$1,025,733

Cites Importance Of Trade Associations

Chicago

• • • Trade associations are important to every element in an industry because they provide service in technical research, education, public relations, market and merchandising research, advertising,

quality standardization, and in many other ways, Miss Minita Westcott, president of the American Trade Assn. Executives, said at Chicago recently in addressing the ATAE annual meeting being held at the Drake Hotel.

ATAE, an association itself, has a membership comprised of more

than 1000 executives of the country's trade associations.

The services enumerated are helpful both to small and large businesses, Miss Westcott said. "Many people when they think of industry, think in terms of 'big business,'" she continued. "But as a matter of fact, less than one-half of 1 pct of the industrial firms are large enough to list their securities on any stock exchange. Ninety-one pct of all the industrial firms in the United States employ fewer than 100 persons each, and 65 pct of the workers in industry in our country are employed by firms having fewer than 500 workers."

Double Aggregate Output

Buffalo

• • • Economy Fuel & Supply Corp. has doubled its capacity for production of lightweight aggregate from slag at the Susquehanna plant of the Hanna Furnace Corp. (The aggregate is mixed with concrete to make building blocks.) An expansion program has lifted output to 200,000 square yards a year.

Economy Fuel is a subsidiary of the Donner-Hanna Coke Corp., which in turn is owned jointly by the National Steel Corp., of which Hanna Furnace is a subsidiary, and Republic Steel Corp.

Lord Greenwood Dies

London

• • • Prominently identified with the British iron and steel industry for a long period of years, Lord Greenwood died in London at the age of 78. A Canadian, he was at one time active in the interests of the Liberal party but in later years represented the Conservative party in the House of Commons. He was president of the British Iron & Steel Federation in 1938, and was active in the wartime control of the industry. He had been chairman of Dorman Long, the Middlesbrough steel producers, since 1934.

Buffalo Forge Dividend

Buffalo

• • • Directors of the Buffalo Forge Co. declared a dividend of 50 cents a share on the common stock, payable Oct. 28 to stockholders of record Oct. 18.

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British Rearmament Plan Cuts Auto Supply 10 Pct

London

•• The government, concerned about exports and niggardly in its allowances for steel to purely home trades and especially trades which have been bracketed arbitrarily or otherwise in the luxury categories, is expected to tighten up its ideas still further in view of the new rearmament proposals. Car manufacturers, it is said, are to have a 10 pct cut in steel supplies for the last quarter of the year. At the same time they have been asked to maintain and if possible increase their export sales, so that the cut must decrease the number of cars, already limited, available for the home market.

One leading group of automobile manufacturers says that already 800 of its weekly outturn of 1000 cars are exported. Half the remainder are earmarked for government departments or nationalized industries.

Iron Ore Consumption Up

Cleveland

•• U. S. and Canadian blast furnaces consumed 7,036,135 gross tons of Lake Superior iron ore in August, highest for any month since January, when 7,056,667 gross tons were consumed, according to the monthly report of the Lake Superior Iron Ore Association.

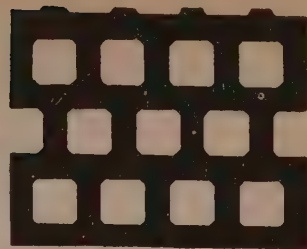
The increased consumption was the result of new blast furnace capacity, including furnaces of the U. S. Steel Corp. at South Chicago, and Lorain, Pittsburgh Steel Co., Monessen, Pa., and resumption of operation by Wheeling Steel Corp. furnaces at Steubenville, O., and Wickwire Spencer Div. of Colorado Fuel & Iron Corp. at Buffalo, N. Y.

Stocks of Lake Superior iron ore on hand at U. S. and Canadian furnace yards and Lake Erie docks totaled 37,080,989 Sept. 1, compared with 32,610,785 Aug. 1 and 33,896,462 Sept. 1, 1947.

Blast furnaces depending principally on Lake Superior iron ore in blast Sept. 1 numbered 171 in the U. S. and 9 in Canada. Thirteen U. S. and one Canadian furnace were idle.

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Signs of Pre-election Slump in Evidence As Inquiries Decrease

• • • Signs of a pre-election slump in the machine tool business were in evidence this week as inquiries dropped to subnormal levels in major sales sectors and new firm orders were as rare as a Wallace supporter with a good job.

Figures released by National Machine Tool Builders' Assn. indicated that the slump was not entirely new. NMTBA figures for September showed new firm orders little improved over August, which was no banner month. Only shipments showed serious improvement, with September's index 84.7 as compared with 69.8 for August.

To some observers these developments seemed to promise future difficulties for the industry in reaching its unofficially avowed goal of \$300 million for 1948. Fourth quarter prospects, according to reliable sources, are anything but bright. As far as mass machine tool buying is concerned, ECA and the defense program are both momentarily at least on dead center. Thus it is that some machine tool companies are doing only 50 pct of what they were doing 6 weeks or 2 months ago.

In Detroit, the slightly accelerated tempo of machine tool activity continues although some segments of the industry are at very low ebb. Tool and die shops and special machine builders are examples. Most sources believe the increased complexity of tools plus increased costs of raw materials and labor will continue to express themselves in fewer product changes in the years ahead.

GM, for example, seems now to be definitely committed to a single body change each year. Last year, the postwar C body, so called, was introduced. This year the A body will reach the public, possibly late in December but more probably during January. The third GM standard body, the so-called B body will not be introduced until some time in 1949, according to informed sources.

Meanwhile, the brightest spot on the Detroit machine tool front

NMTBA Figures for September Show Little Improvement Over a Poor August

• • •

at the moment is the automatic transmission program activity. Quotations continue to come in for the Saginaw Div. which is scheduled to produce an automatic unit for Chevrolet. The Packard program is now about completed, it is indicated. Considerable interest is currently centered in the Detroit Gear Div. of Borg Warner. Some sources have speculated that Nash and/or Ford (Lincoln) transmissions may be involved in the present tooling program.

With few exceptions, Detroit tool and die shops are working far below capacity. While some shops are rehiring and even planning expansions, the majority of the Detroit tool and die shop units are energetically engaged at the moment in the problem of keeping their shops operating at even a small percentage of capacity.

In Chicago, R. K. Vinson, executive director of Machinery Dealers' National Assn., has announced that Wharton School of Finance and Commerce, University of Pennsylvania will conduct a machine tool conference in conjunction with MDNA Nov. 5 to 6 in Philadelphia. The conference will be devoted to dealer management and merchandising problems in the redistribution of surplus and idle machine tools.

George B. McClennen, Delta Equipment Co., Philadelphia, will serve as chairman of the conference. Conference speakers include Charles McDonald, Sr., president, McDonald Machinery Co., St. Louis; Comm. James McKnight, Air Reduction Co., Murryhill, N. J.; Harold Goldstein, vice-president, Machinery & Electric Motors Co., Chicago; Dr. J. Russell Doubman, Wharton School

of Finance; Howard Given, Given Machinery Co., Los Angeles; Samuel Danits, Donberg & Danits, Chicago; R. A. Vine, president, R. A. Vine, Inc., Detroit; Louis Botwinik, vice-president, Botwinik Bros., Inc., New Haven, Conn.; Ralph Hochman, president, Ralph Hochman & Co., Newark, N. J.; Frank J. Lunney, Frank J. Lunney, Philadelphia; Dr. Herbert W. Hess, Wharton School of Finance; Charles A. Simmons, Sr., president, Simmons Machine Tool Co., Albany; Leonard Morey, Morey Machinery Co., Inc., New York; and Joseph T. Weiss, president, Interstate Machinery Co., Inc., Chicago.

Elsewhere, numerous segments of the machine tool industry are having trouble obtaining steel plates and a request for allocations has been considered and rejected. Future developments may alter this decision however.

R. C. Baumgartner, export manager of Oster Mfg. Co. departed last week on an 18,000 mile trip to 16 South American countries to strengthen present relations between Oster and its foreign representatives.

If the present gradual downward trend in machine tool orders continues, those dealers carrying a large number of lines will not be as badly hit as the company representative selling a single line, according to trade sources.

Burke Machine Tool Co., Conneaut, Ohio, was scheduled to go on the auction block this week.

Republic Income Spurts

Cleveland

• • • Republic Steel Corp. reported consolidated net income for the third quarter of 1948 of \$12,874,398, after all charges including a provision for federal income taxes of \$9,400,000.

Republic earned \$6,380,016 for the corresponding quarter in 1947 and \$7,805,410 for the second quarter 1948.

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MARVEL High-Speed-Edge Blades assure Faster, more Accurate cutting with proven Economy and complete Safety. Only the MARVEL is a composite blade with a genuine 18% Tungsten high speed steel cutting edge electrically welded to an exceptionally tough, strong alloy steel body.

The High-Speed-Edge does the cutting while the alloy back, with hardened eyes, carries the load. Blade tensions up to 300% higher than those possible with ordinary blades are recommended. This greater tension is confined to the cutting or leading edge by the location of pin holes (exclusive MARVEL design feature) and cannot be overcome by work resistance. Heavier feeds and greater speeds are practical without “run out.”

With greater accuracy, higher production and lower cost per cut, comes the extra dividend of Safety, for MARVEL High-Speed-Edge Hack Saw Blades are Positively Unbreakable — they will not shatter.

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1. Genuine 18% Tungsten High-Speed-Steel cutting edge.
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News of Zinc Increase Comes as No Surprise to Wary Consumers

New York

••• News of the half cent price increase in zinc made by all producers last week came as no surprise to consumers who had long been dreading the possibility of increases in lead and zinc. Premium prices being paid by some consumers for zinc were as much as 2.5¢ above the domestic market; for lead, as much as 4¢ to 5¢ above the market. Strikes are still under way at the Fairmount and Hillsboro, Ill. plants of American Zinc, Lead & Smelting Co. and there is no early prospect for settlement.

So far, neither brass mills nor anode manufacturers have revised upward their brass or zinc products. The proportion of zinc contained in brass products is a relatively small cost factor in mill products and mills have not determined yet whether in the present state of the market this cost can be absorbed.

Consumers are fearful that this break in the metals price structure, coupled with the news of the more aggressive metal buying program of the Federal Bureau of Supply for the stockpile may presage an increase in the price of lead. There is relatively small possibility of an increase in the price of copper at this time as supply and demand are rather well in balance even with the stockpiling program when South American copper is taken into account. Also all major copper producers are firmly convinced that there would be more loss than gain from a higher copper market at this time.

There is some possibility of a higher cadmium anode price in the early future as it is understood that representative anode suppliers find

Fear That First Break May Be Followed By Increase Of Prices On Lead

o o o

themselves with order backlogs of about 100,000 lb accumulated largely during the last month. A strike at the plant of the supplier to one of the major anode distributors has

lasted for more than 6 weeks, and requirements normally taken care of by this factor have flooded into other suppliers. The secondary aluminum market rose again last week with a growth in the volume of business from foundries. The market has increased sharply in the last few weeks, accompanied by repeated increases in the price of aluminum scrap. With renewed buying by the secondary producers, aluminum scrap has become very scarce again.

No Allocations For Metals Stockpiles

Washington

••• Further meetings between government and industry for discussion of nonferrous stockpiling needs and methods of procurement are in the cards. But until something far more serious develops, the move to bring nonferrous purchases under a voluntary allocations program has been discarded.

This was made evident last week at meetings between producers and importers of zinc, cadmium, lead and bismuth with Munitions Board, Bureau of Federal Supply, and other government officials.

In the case of zinc, industry felt that the stockpile shortage was not serious enough to justify the red tape necessary to place the metal on an allocation basis. A similar decision had been reached earlier in the month in respect to copper.

Lead supplies present a tougher problem, however, it was agreed. Producers have been beset with strikes and other troubles. Even

scrap recovery has been weak. Another meeting has been scheduled for Nov. 9 on the lead situation but it is clear that allocations will not be accepted.

Much criticism has been leveled at both the Munitions Board and the Federal Bureau of Supply, the board's purchasing agent. Industry feels that it has been kept too much in the dark concerning needs and buying plans; complaint has been made that the Bureau has not been vigorous enough in going out and hunting sources for such amounts as the board has authorized.

Now that it has a better idea of what is needed and the board plans, many industry members feel that sufficient tonnages can be made available to meet defense needs without seriously disrupting the flow of nonferrous items to domestic consumers. At the same time the Bureau of Federal Supply has indicated that it will push the buying program more energetically.

Copper producers were the first nonferrous group to decline voluntary allocations as a means of building up the nation's stockpile of strategic metals. At a meeting between government and industry the copper producers had indicated that they preferred for the government to deal with each producer on an individual basis.

Nonferrous Metals Prices

	Oct. 20	Oct. 21	Oct. 22	Oct. 23	Oct. 25	Oct. 26
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03
Zinc, East St. Louis	15.50	15.50	15.50	15.50	15.50	15.50
Lead, St. Louis	19.30	19.30	19.30	19.30	19.30	19.30

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Aluminum, American, Laredo, Tex.	38.50
Aluminum copper, 3.75-4.25% Be	
Dollars per lb contained Be	\$24.50
Aluminum aluminum 5% Be, dollars	
er lb contained Be	\$52.00
Aluminum, del'd	\$1.90
Al, 97-99% (per lb)	\$1.65 to \$1.72
Al, electro, Conn. Valley	23.50
Al, lake, Conn. Valley	23.625
Al, U. S. Treas., dollars per oz.	\$35.00
Aluminum, 99.8%, dollars per troy oz.	\$2.25
Aluminum, dollars per troy oz.	\$110 to \$120
Al, St. Louis	19.30
Al, New York	19.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Magnesium, dollars per 76-lb flask, f.o.b. New York	\$75 to \$78
Magnesium, electro, f.o.b. New York	42.90
Magnesium, dollars per troy oz.	\$24.00
Aluminum, dollars per troy oz.	\$93 to \$96
Al, New York, cents per oz.	77.50
Al, Grade A, New York	\$1.03
Al, East St. Louis	15.50
Al, New York	16.15
Aluminum copper, 20 pct Zr, per lb contained Zr	\$8.75

Remelted Metals

Brass Ingot

Published prices, cents per lb delivered, carloads)

5-5-5 ingot	
No. 115	20.00*
No. 120	19.50*
No. 123	19.00*
10-10 ingot	
No. 305	27.25
No. 315	24.25
10-2 ingot	
No. 210	33.00
No. 215	31.00
No. 245	24.50*
Low ingot	
No. 405	16.50*
Manganese bronze	17.50
No. 421	23.00
F.o.b. Philadelphia.	

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

5 aluminum-silicon alloys	
30 copper, max.	28.00-28.50
60 copper, max.	28.00-28.50
Aluminum alloys (No. 122 type)	24.50-25.00
12 aluminum (No. 2 grade)	24.00-24.50
Alloy	24.25-24.75
Alloy	24.75-25.25
Alloy	28.00-28.50
CS-679	24.50-25.00
Steel deoxidizing aluminum, notch-bar granulated or shot	
Grade 1-95 pct-95% pct.	26.50-27.00
Grade 2-92 pct-95 pct.	24.75-25.00
Grade 3-90 pct-92 pct.	24.25-24.50
Grade 4-85 pct-90 pct.	23.75-24.00

Electroplating Supplies

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40%
Electrodeposited	34%
Roll, oval, straight, delivered	37.34
Roll anodes	38%
Cast, 80-20	
Cast, oval, 15 in. or longer	35%
Cast, oval, 99.99	22.50
Roll anodes	20.50
Nickel 99 pct plus	59.00
Cast	60.00
Roll, depolarized	\$2.00
Aluminum	
99.99 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	84%

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Steel salts, single or double, 100 lb bags, frt. allowed	18.50
Nickel chloride, 300 lb bbl.	24.50
Copper cyanide, 100 oz. lots, per oz.	65
Aluminum cyanide, 96 pct domestic 100 lb drums	16.00
Copper sulfate, crystals, 22.5 pct, bags	5.90
Copper sulfate, 25 pct, granules, bbls.	
Frt. allowed	7.90

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to \$1.07; 35 to 37, 45.7¢ to \$1.65; 47 to 49, 67.5¢ to \$2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drrawn, ½ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ½ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ¾ to 1.03 in., R317-T4, 36.5¢ to 33.5¢; rolled, 1/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2½ to 3½ in., R317-T4, 32.5¢ to 31.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: M, FSA, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-1.01; 22, \$1.22-\$1.31; 24, \$1.62-\$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb. per ft. per. up to 5.9 in., 51¢; 0.50 to 0.59 lb. per ft. per. up to 8.6 in., 47¢; 1.8 to 2.59 lb. per ft. per. up to 19.5 in., 44¢; 4 to 6 lb. per ft. per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, \$1.14; 5/16 to ¾, \$1.02; ¾ to 1, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ¾ to 7/16, 85¢; ¾ to 1, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ¾ to 1, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78		37.18
Copper, hot-rolled		33.28	
Copper, drawn		34.28	
Low brass	38.07*	34.85	35.16
Yellow brass	36.76*	33.44	33.76
Red brass	38.55*	35.33	35.64
Naval brass	35.92	32.67	38.61
Leaded brass		28.30	
Commercial			
bronze	39.29*	36.32	36.63
Manganese bronze	37.51	36.01	42.11
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	33.47	32.22	36.66
Everdur, Herculo, Olympic, etc.	40.43	40.67	41.73
Nickel silver, 10 pct		46.42	44.20
Architectural bronze			32.33
* Seamless tubing.			

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 or more)

	Heavy	Turnings
Copper	21½	20%
Yellow brass	18	17½
Red brass	19½	19
Commercial bronze	19½	19
Manganese bronze	17½	16%
Leaded brass rod ends	17½	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	20.25
No. 2 copper wire	19.25
Light copper	18.25
Refinery brass	18.25*-18.50*
* Dry copper content.	

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	19.50
No. 2 copper, wire	18.50
Light copper	17.50
No. 1 composition	16.25
No. 1 comp. turnings	15.50
Roller brass	12.00
Brass pipe	12.50
Radiators	13.25
Heavy yellow brass	11.50

Aluminum

Mixed old cast	15.00
Mixed old clips	15.25
Mixed turnings, dry	13.00
Pots and pans	15.25
Low copper	17.50-18.00

Dealers' Scrap

(Dealer's buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	17½-18
No. 2 heavy copper and wire	16½-17
Light copper	15½-16
Auto radiators (unsweated)	11½-12
No. 1 composition	14-14½
No. 1 composition turnings	13½-14
Clean red car boxes	12-12½
Cocks and faucets	11½-11¾
Mixed heavy yellow brass	8¾-9¼
Old rolled brass	11-11¼
Brass pipe	11½-12¼
New soft brass clippings	13½-14
Brass rod ends	11-11½
No. 1 brass rod turnings	10¼-10¾

Aluminum

Alum. pistons and struts	8-8½
Aluminum crankcases	10-10½
2S aluminum clippings	13-13½
Old sheet & utensils	10-10½
Borings and turnings	5½-6
Misc. cast aluminum	10-10½
Dural clips (24S)	10-10½

Zinc

New zinc clippings	10½-11
Old zinc	8½-8¾
Zinc routings	4½-5
Old die cast scrap	5-5½

Nickel and Monel

Pure nickel clippings	22-23
Clean nickel turnings	17-18
Nickel anodes	22-23
Nickel rod ends	21-22
New Monel clippings	15½-16½
Clean Monel turnings	11-12
Old sheet Monel	13-14
Old Monel castings	10-11
Inconel clippings	12-13
Nickel silver clippings, mixed	8-8½
Nickel silver turnings, mixed	6½-7

Lead

Soft scrap lead	18-18½
Battery plates (dry)	12-12½

Magnesium Alloys

Segregated solids	8-9
Castings	4½-5½

Miscellaneous

Block tin	82-84
No. 1 pewter	65-67
No. 1 auto babbitt	51-53
Mixed common babbitt	14½-15½
Solder joints	19½-20¼
Siphon tops	50-52
Small foundry type	20-20½
Monotype	19-19½
Lino. and stereotype	18-18½
Electrotype	16½-17
New type shell cuttings	15-15½
Hand picked type shells	6½-7
Lino. and stereo dross	9½-10
Electro dross	6½-7

Immediate shipments from stock of U·S·S Carillo Steel

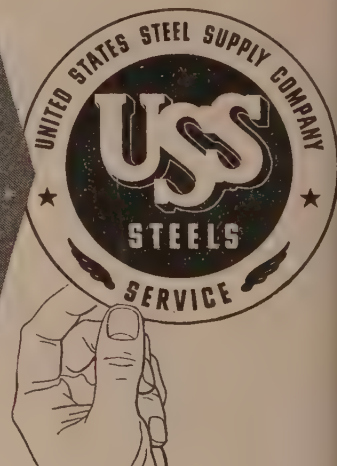


— manufactured to a
Guaranteed Minimum Hardenability

If you are a user of alloy steel, it is to your advantage to know that U·S·S Carillo Steels in our stock are manufactured to a *Guaranteed Minimum Hardenability*.

And when you place an order with us for U·S·S Carillo Steel you get an additional metallurgical service: *A Heat Treatment Guide which contains complete and specific information about the steel you receive is supplied you with each individual shipment.* This guide gives you *specific* data on the composition, potential physical properties and fabrication of the steel to help you obtain the maximum performance from the steel we furnish on your order.

In addition to these advantages, large and diversified stocks of U·S·S Carillo Steel make it possible for us to serve your alloy requirements quickly. You are assured of reliable performance when you order alloy steels featuring *Guaranteed Minimum Hardenability*.



UNITED STATES STEEL SUPPLY COMPANY



CHICAGO (90)	1319 Wabansia Ave., P. O. Box MM	BRunswick 8-2000	MILWAUKEE (1)	4027 W. Scott St., P.O. Box 2045 Mitchell 5-7500
BALTIMORE (3)	Bush & Wicomico Sts., P. O. Box 2036	EDmondson 4900	NEWARK (1), N.J.	Foot of Bessemer St., P. O. Box 479 REctor 2-6560—BErgen 3-1614
BOSTON	176 Lincoln St., (Allston 34), P. O. Box 42	STadium 2-9400	PITTSBURGH (12)	1281 Reedsdale St., N. S. ALlegheny 4200
CLEVELAND (4)	7105 Bessemer Ave.	BRoadway 5000	ST. LOUIS (3)	311 S. Sarah St., P. O. Box 27 LUCas 0440
LOS ANGELES (54)	2087 East Slauson Avenue P. O. Box 2826—Terminal Annex	LAfayette 0102	SAN FRANCISCO (1)	1940 Harrison St., P. O. Box 368 MArket 1-4988
			TWIN CITY	2545 University Ave., St. Paul (4), Minn. ENterprise 1-0017
				NEstor 7311

UNITED STATES STEEL

No Significant Changes In Market Status

New York

• There were few price changes of significance in the market this week. Shipments generally continued to move in good volume and although some of the mills have held to their stiff inspection routine, they will take all the good scrap they can get.

Some of the railroad grades advanced \$1 in St. Louis, while in Chicago some went up \$1 while others went down \$1. Despite any talk of weakness in this field, the market continues strong.

Cast grades in Chicago and St. Louis in some cases were stronger with a few of the grades going up \$1. In Pittsburgh, mixed yard cast went up 25¢ a ton, while heavy breakable cast climbed 50¢.

For the second consecutive week shortage of railroad cars prevails and this tends to complicate movement of shipments in the Pittsburgh and Philadelphia areas in particular. Use of cars for main shipments in the midwest and lack of replacement orders for old cars that have been taken out of service are offered by some sources as reasons for the current shortage.

The bulk of the melting scrap in some areas is light material at present. This makes for a great deal of bundled material on the market and ties in with the fact that mills have recently been rejecting substantial tonnages of this material as a result of poor quality detected through rigid inspection. The mills are presently well fixed for the most part and though they will in all probability be hard pressed in a few months they can feel free to demand what they pay for right now.

Some sources are again putting forth the feeling that the scrap shortage is not as acute as most people feel. There is basically nothing to back feelings of comacency that exist at this time. However, the testing point is not far around the corner—our first bad weather.

PITTSBURGH — Mill inventories of heavy melting steel are reported better

than they have ever been this year. Yet most mills are still anxious to buy at present prices and good quality scrap is almost impossible to get on the open market. The shortage of freight cars in the district is holding up shipments from yards; some are badly stymied for lack of gondolas. Mixed yard cast iron scrap was up 25¢ to a top of \$64.50. Heavy breakable cast advanced by 50¢. Railroad specialties declined another dollar during the week in the face of weakening demand from steel foundries. No one is trying to hold any openhearth steel scrap—Though the first good snow will test current prices, some sources say.

CHICAGO—Prices remained stable last week with the exception of some railroad specialties. Brokers are not taking large orders from the mills. The mills claim this is because they are not placing large tonnages. One mill is still out of the market on all dealer scrap. Strict inspection is still in vogue. Since the mills started breaking bundles to check quality the dealer scrap has improved considerably. The cast market remains very strong.

PHILADELPHIA—Heavy melting scrap is in easy supply in this market and mills are continuing to reject off-grade shipments, particularly bundled scrap. Mill inventories are adequate for current operations, but winter inventories are not yet apparent. The fall intake of yard scrap has proved disappointing, but the pressure is off largely due to the tonnage of foreign scrap being unloaded. Some factors estimate that some 40,000 tons have been unloaded in this area in the last 4 weeks. Prices of heavy melting grades are firm largely because of the limited quantities of good scrap available. Foundry cast is strong, although some foundries are in a better position for scrap than for some time. The renewed availability of foundry pig iron in this market may account for this development.

CLEVELAND—Shipments to consumers here and in the Valley are down somewhat from pre-holiday levels for the third consecutive week. Despite talk of weakness, the market is very strong. Bulk of the available scrap is light material and the bundling machines are getting a workout. Foundry grades have tapered off somewhat, but are anything but weak. Brokers are able to buy very little at going prices and offerings of \$2 to \$5 over are rather common. The present scrap market is, from a price point of view, actually two markets, one at the formula for mills and the other, from \$2 to \$5 over for converters, ingot makers and the rest of the trade.

DETROIT—No price changes are reported in the Detroit market this week and both industrial and dealer scrap continues to move in good volume. Foundry sources continue to report a substantial

number of rejections. If anything, the cast market is tending toward the weak side. While scattered information is available predicting a growing tightness of the cast market, local buyers indicate that dealers always "happen to have some" whenever the buyers decide to enter the market.

CINCINNATI—Apart from the foundry grades, which are continuing to show signs of weakness, there has been no major change in the market here. Openhearth material is moving small tonnages to major consumers at current price levels, although out-of-district buyers are active.

NEW YORK — The market continues static pricewise and far as volume of shipments is concerned. Some mills are strict in their inspection procedures in an effort to get the best scrap they can. They will, however, take any good scrap they can get their hands on for the most part. The comfortable feeling that most mills harbor at this time, some sources believe, is a little premature and that winter time will bring a rush for all the scrap that is available.

BIRMINGHAM — Although prices remain firm for all grades of scrap in this market, a slightly weaker undertone from the standpoint of demand has developed for foundry grades of steel. Cast grades remain extremely tight. Dealers expect receipts of agricultural scrap to increase here since cotton-picking has been completed in South Alabama.

BOSTON—Despite a letdown in demand in both scrap and cast grades, there is no further drop in price. A possible exception is stove plate which has moved up from \$53.50 to \$54.50 to between \$56 to \$57. All other prices are the same with brokers reporting a quiet market.

ST. LOUIS—Deals whereby consumers take in railroad scrap at higher than market prices with orders for finished products continue in the St. Louis market. Receipts generally in the market are fair and steel mills are taking offerings at market price levels. Buying of foundry grades has eased off.

BUFFALO — Movement of mill scrap in the stalemated local market was at low ebb this week, consisting chiefly of earmarked and conversion stuff. Neither side showed signs of yielding and one pessimist said it might last until the snow flies.

LOS ANGELES — Skyrocketing scrap costs and scarcity of pig iron are threatening the existence of many small gray iron foundries in the southern California area. It was their historic low material costs that allowed them to compete with larger eastern foundries. In less than a year the cost of No. 1 cupola cost in a highly unstable and fluctuating market, has gone from \$35 to \$37 per ton (January 1948) to as high as \$68 per ton today.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.50 to \$43.00
RR. hvy. melting	43.50 to 44.00
No. 2 hvy. melting	42.50 to 43.00
RR. scrap rails	58.00 to 59.00
Rails 2 ft and under	62.00 to 62.50
No. 1 comp'd bundles	42.50 to 43.00
Hand bldd. new shts.	42.50 to 43.00
Hvy. axle turn.	45.50 to 46.50
Hvy. steel forge turn.	45.50 to 46.50
Mach. shop turn.	37.50 to 38.00
Shoveling turn.	39.50 to 40.00
Mixed bor. and turn.	37.50 to 38.00
Cast iron borings	39.50 to 40.00
No. 1 mach. cast	69.50 to 70.50
Mixed yard cast	63.50 to 64.50
Hvy. breakable cast	61.00 to 62.00
Malleable	76.00 to 77.00
RR. knuck. and cup.	58.50 to 59.00
RR. coil springs	58.50 to 59.00
RR. leaf springs	58.50 to 59.00
Rolled steel wheels	58.50 to 59.00
Low phos.	49.00 to 50.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$41.50 to \$42.00
No. 2 hvy. melting	41.50 to 42.00
No. 1 bundles	41.50 to 42.00
No. 2 dealers' bundles	41.50 to 42.00
Bundled mach. shop turn.	39.50 to 40.00
Galv. bundles	39.50 to 40.00
Mach. shop turn.	36.50 to 37.00
Short shov. turn.	38.50 to 39.00
Cast iron borings	37.50 to 38.00
Mix. borings and turn.	36.50 to 37.00
Low phos. hvy. forge	51.00 to 52.00
Low phos. plates	49.00 to 50.00
No. 1 RR. hvy. melt.	44.25 to 50.00
Rerolling rails	66.00 to 68.00
Miscellaneous rails	64.00 to 65.00
Angles & splice bars	56.50 to 57.50
Locomotive tires, cut	59.00 to 60.00
Cut bolster & side frames	51.00 to 52.00
Standard stl. car axles	79.00 to 80.00
No. 3 steel wheels	53.00 to 54.00
Couplers and knuckles	54.00 to 55.00
Rails, 2 ft and under	60.00 to 65.00
Malleable	83.00 to 84.00
No. 1 mach. cast.	70.00 to 72.00
No. 1 agricul. cast.	63.00 to 65.00
Heavy breakable cast.	62.00 to 63.00
RR. grate bars	62.00 to 64.00
Cast iron brake shoes	59.00 to 60.50
Cast iron car wheels	62.00 to 63.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	\$40.00 to \$41.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turn.	37.00 to 38.00
Cast iron borings	36.00 to 37.00
Mixed bor. & turn.	35.00 to 36.00
Low phos., 18 in. under	48.00 to 49.00
No. 1 cupola cast.	65.00 to 66.00
Hvy breakable cast	59.00 to 60.00
Rails 18 in. and under	61.00 to 63.00
Rails random length	56.00 to 57.00
Drop broken	69.00 to 70.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$34.40 to \$36.40
No. 2 hvy. melting	34.40
Nos. 1 and 2 bundles	34.40
Bushellings	34.40
Shoveling turn.	31.40
Machine shop turn.	29.40
Mixed bor. and turn.	29.40
Cl'n cast chem. bor.	38.00 to 39.00
No. 1 machinery cast.	64.00 to 65.00
No. 2 machinery cast.	59.00 to 60.00
Heavy breakable cast.	53.50 to 54.50
Stove plate	56.00 to 57.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	\$38.00
No. 2 hvy. melting	38.00
No. 1 bundles	38.00
New busheling	38.00
Flashings	38.00
Mach. shop turn.	\$32.50 to 33.00
Machinery cast	63.00 to 65.00
Mixed yard cast	57.00 to 58.00
Shoveling turn.	34.50 to 35.00
Cast iron borings	33.50 to 34.00
Mixed bor. & turn.	34.50 to 35.00
Low phos. plate	42.50 to 43.00
Heavy breakable cast.	53.00 to 57.00
Stove plate	57.00 to 58.00
Automotive cast.	64.00 to 66.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$44.50 to \$45.50
No. 2 hvy. melting	41.00 to 41.50
No. 1 bundles	44.50 to 45.50
No. 2 bundles	41.00 to 41.50
Mach. shop turn.	37.00 to 38.00
Shoveling turn.	38.50 to 39.00
Mixed bor. and turn.	36.50 to 37.50
Clean cast chemical bor.	43.00 to 45.00
No. 1 machinery cast.	66.00 to 67.00
No. 1 mixed yard cast.	61.00 to 62.00
Hvy. breakable cast.	62.00 to 63.00
Clean auto cast.	65.00 to 66.00
Hvy. axle forge turn.	46.00 to 47.00
Low phos. plate	50.00 to 51.00
Low phos. punchings	51.00 to 52.00
Low phos. bundles	48.00 to 49.00
RR. steel wheels	54.00 to 55.00
RR. coil springs	54.00 to 55.00
RR. malleable	80.00 to 82.00
Cast iron carwheels	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$43.00 to \$44.00
No. 2 hvy. melting	40.00 to 41.00
Bundled sheets	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turnings	37.00 to 38.00
Locomotive tires, uncut	47.00 to 48.00
Mis. std. sec. rails	57.00 to 58.00
Steel angle bars	54.00 to 55.00
Rails 3 ft and under	60.00 to 62.00
RR. steel springs	49.00 to 50.00
Steel car axles	63.00 to 65.00
Brake shoes	59.00 to 60.00
Malleable	75.00 to 77.00
Cast iron car wheels	60.00 to 61.00
No. 1 machinery cast.	66.00 to 67.00
Hvy. breakable cast.	60.00 to 61.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$40.00
No. 2 hvy. melting	40.00
No. 2 bundles	40.00
No. 1 busheling	40.00
Long turnings	\$32.00 to 33.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	29.50
Bar crops and plate	44.00 to 45.00
Structural and plate	44.00 to 45.00
No. 1 cupola cast.	67.00 to 68.00
Stove plate	64.00 to 65.00
No. 1 RR. hvy. melt.	41.00
Steel axles	51.00 to 52.00
Scrap rails	44.00 to 45.00
Rerolling rails	57.00 to 60.00
Angles & splice bars	51.00 to 53.00
Rails 3 ft & under	52.00 to 55.00
Cast iron carwheels	57.00 to 58.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.50 to \$43.00
No. 2 hvy. melting	42.50 to 43.00
Mach. shop turn.	37.50 to 38.00
Short shov. turn.	39.00 to 40.00
Cast iron borings	38.00 to 39.00
Low phos.	47.50 to 48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$38.50 to \$39.00
No. 2 hvy. melting	37.00
No. 2 bundles	37.00
Mach. shop turn.	31.50 to 32.00
Mixed bor. & turn.	31.50 to 32.00
Shoveling turnings	33.50 to 34.00
Machinery cast	59.00 to 60.00
Mixed yard cast	57.00 to 58.00
Heavy breakable cast.	56.00 to 57.00
Charging box cast.	56.00 to 57.00
Unstrp. motor blks.	53.50 to 54.50
Cl'n cast chem. bor.	38.50 to 39.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$47.00 to \$49.00
No. 2 hvy. melting	41.75 to 42.25
No. 1 bundles	41.75 to 42.25
No. 2 bundles	41.75 to 42.25
No. 1 busheling	41.75 to 42.25
Mach. shop turn.	36.75 to 37.25
Shoveling turn.	37.25 to 38.00
Cast iron borings	37.75 to 38.25
Mixed bor. and turn.	36.75 to 37.25
Clean auto. cast.	65.00 to 66.00
Mixed cupola cast.	65.00 to 66.00
Stove plate	64.00 to 65.00
RR. malleable	70.00 to 75.00
Small indus. malleable	47.00 to 49.00
Low phos. plate	48.00 to 50.00
Scrap rails	58.00 to 60.00
Rails 3 ft & under	63.00 to 64.00
RR steel wheels	58.00 to 60.00
RR. coil & leaf spgs.	58.00 to 60.00
RR. knuckles & coup.	58.00 to 60.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.00 to \$42.50
No. 2 hvy. melting	42.00 to 42.50
No. 1 bundles	42.00 to 42.50
No. 1 busheling	42.00 to 42.50
Drop forge flashings	42.00 to 42.50
Mach. shop turn.	37.00 to 37.50
Shoveling turn.	38.50 to 39.50
Steel axle turn.	42.00 to 42.50
Cast iron borings	37.50 to 38.50
Mixed bor. & turn.	36.50 to 37.50
Low phos. 2 ft and under	47.00 to 47.50
No. 1 machinery cast.	72.00 to 74.50
Malleable	79.00 to 81.00
RR. cast.	76.00 to 77.00
Railroad grate bars	60.00 to 62.00
Stove plate	61.00 to 63.00
RR. hvy. melting	43.00 to 43.50
Rails 3 ft and under	63.50 to 64.50
Rails 18 in. and under	65.00 to 66.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$27.50
No. 2 hvy. melting	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	18.00
Elec. fur. 1 ft under	\$40.00 to 42.00
No. 1 cupola cast.	58.00 to 60.00
RR. hvy. melting	28.50
Rails	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$27.50
No. 2 hvy. melting	27.50
No. 1 bales	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	20.00
Elec. fur. 1 ft under	\$40.00 to 42.00
No. 1 cupola cast.	58.00 to 60.00
RR. hvy. melting	28.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	\$27.50 to \$30.00
Elec. fur. 1 ft and under	40.00 to 42.00
No. 1 cupola cast.	50.00 to 54.00
RR. hvy. melting	30.00 to 33.00

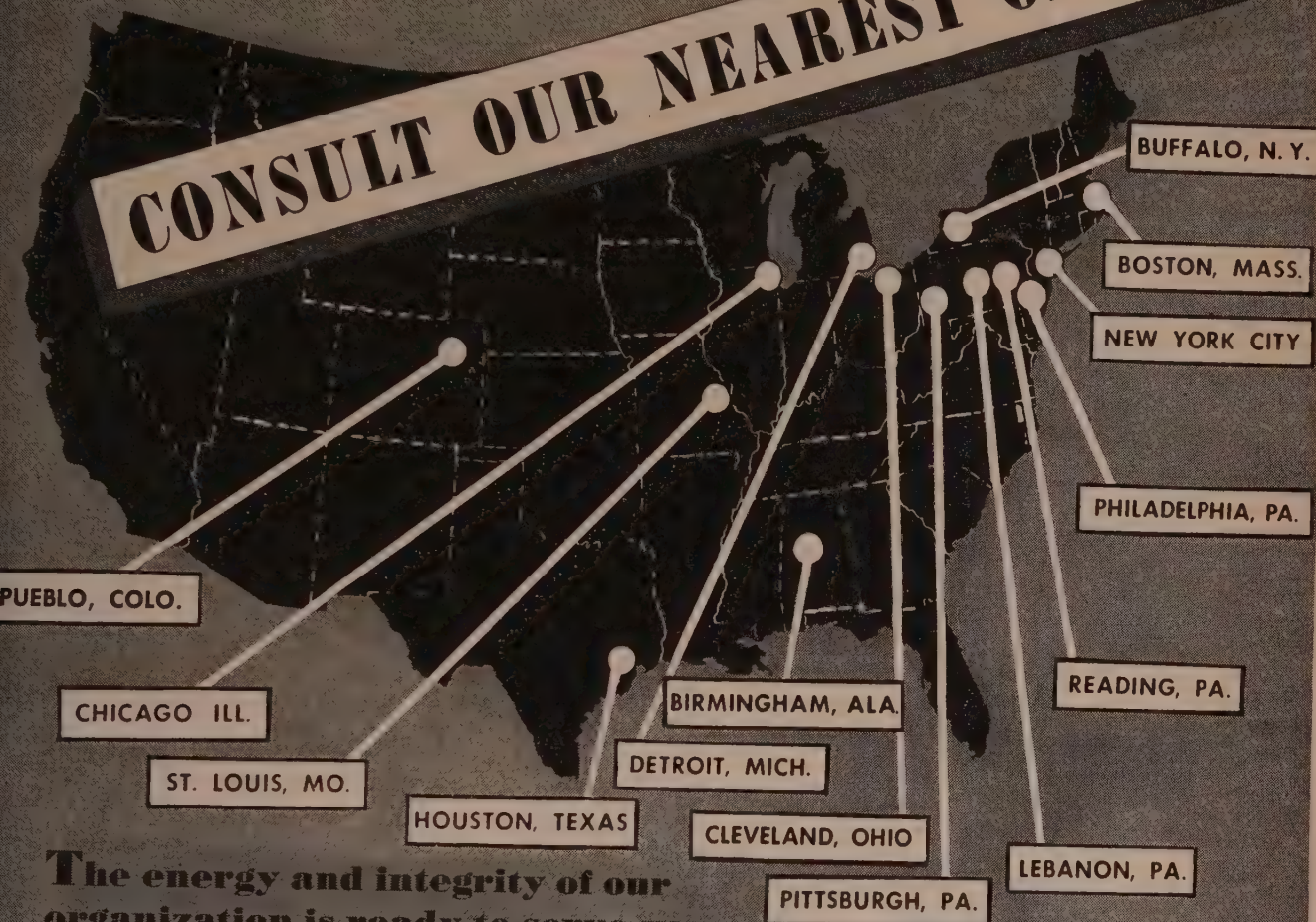
HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:

Heavy melting	\$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushellings	17.50*
Bushellings, new fact. prop'd.	21.00*
Bushellings, new fact. unprop'd.	16.00*
Short steel turnings	17.00*
No. 1 cast	\$48.00 to 50.00*
No. 2 cast	44.00 to 45.00*
*Ceiling Price	

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Oct. 26,	Oct. 19,	Sept. 28,	Oct. 28,
(cents per pound)	1948	1948	1948	1947
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	6.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	30.50

Tin and Terneplate:

(dollars per base box)				
Tinplate (1.50 lb) cokes	\$6.80	\$6.80	\$6.80	\$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90

Bars and Shapes:

(cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	7.15

Wire:

(cents per pound)				
Bright wire	4.256	4.256	4.256	3.55

Rails:

(dollars per 100 lb)				
Heavy rails	\$3.20	\$3.20	\$3.20	\$2.75
Light rails	3.55	3.55	3.55	3.10

Semifinished Steel:

(dollars per net ton)				
Rerolling billets	\$52.00	\$52.00	\$52.00	\$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†

Wire rod and Skelp:

(cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

Pig Iron:	Oct. 26,	Oct. 19,	Sept. 28,	Oct. 28,
(per gross ton)	1948	1948	1948	1947
No. 2, foundry, Phila.	\$51.56	\$51.56	\$51.56	\$41.36
No. 2, Valley furnace	46.50	46.50	43.50	36.50
No. 2, Southern Cin'ti	49.47	49.47	49.47	40.24
No. 2, Birmingham	43.38	43.38	43.38	34.88
No. 2, foundry, Chicago†	46.00	46.00	43.00	36.00
Basic del'd Philadelphia	50.76	50.76	50.76	40.86
Basic, Valley furnace	46.00	46.00	43.00	36.00
Malleable, Chicago†	46.50	46.50	43.50	36.50
Malleable, Valley	46.50	46.50	43.50	36.50
Charcoal, Chicago	73.78	73.78	69.55	56.04
Ferromanganese†	161.71	161.71	145.00	145.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

† Average of U. S. prices quoted on Ferroalloy page.

Scrap

(per gross ton)				
Heavy melt'g steel, P'gh.	\$42.75	\$42.75	\$42.75	\$42.50
Heavy melt'g steel, Phila.	45.00	45.00	45.00	42.50
Heavy melt'g steel, Ch'go	41.75	41.75	41.75	42.75
No. 1, hy. comp. sh't, Det.	38.00	38.00	38.00	34.75
Low phos. Young'n.	47.75	47.75	47.75	46.25
No. 1, cast, Pittsburgh	70.00	70.00	70.00	47.50
No. 1, cast, Philadelphia	66.50	65.50	65.50	53.00
No. 1, cast, Chicago	71.00	69.50	71.00	52.50

Coke, Connellsville:

(per net ton at oven)				
Furnace coke, prompt	\$15.00	\$15.00	\$15.00	\$12.50
Foundry coke, prompt	17.00	17.00	17.00	14.00

Nonferrous Metals:

(cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	\$1.03	\$1.03	\$1.03	80.00
Zinc, East St. Louis	15.50	15.00	15.00	10.50
Lead, St. Louis	19.30	19.30	19.30	14.80
Aluminum, virgin	17.00	17.00	16.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	35.00	33.00

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 93 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL (Base Price)

Oct. 26, 1948	3.75255¢ per lb.
One week ago	3.75255¢ per lb.
One month ago	3.75255¢ per lb.
One year ago	3.19541¢ per lb.

	HIGH		LOW	
1948....	3.75325¢ July 27		3.22566¢ Jan. 1	
1947....	3.19541¢ Oct. 7		2.87118¢ Jan. 7	
1946....	2.83599¢ Dec. 31		2.54490¢ Jan. 1	
1945....	2.44104¢ Oct. 2		2.38444¢ Jan. 2	
1944....	2.30837¢ Sept. 5		2.21189¢ Oct. 5	
1943....	2.29176¢		2.29176¢	
1942....	2.28249¢		2.28249¢	
1941....	2.43078¢		2.43078¢	
1940....	2.30467¢ Jan. 2		2.24107¢ Apr. 16	
1939....	2.35367¢ Jan. 3		2.26689¢ May 16	
1938....	2.58414¢ Jan. 4		2.27207¢ Oct. 18	
1937....	2.58414¢ Mar. 9		2.32263¢ Jan. 4	
1936....	2.32263¢ Dec. 28		2.05200¢ Mar. 10	
1935....	2.07642¢ Oct. 1		2.06492¢ Jan. 8	
1934....	2.15367¢ Apr. 24		1.95757¢ Jan. 2	
1933....	1.95578¢ Oct. 3		1.75836¢ May 2	
1932....	1.89196¢ July 5		1.83901¢ Mar. 1	
1931....	1.99626¢ Jan. 13		1.86586¢ Dec. 29	
1930....	2.25488¢ Jan. 7		1.97319¢ Dec. 9	
1929....	2.31773¢ May 28		2.26498¢ Oct. 29	

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

....	\$46.82 per gross ton....
....	\$46.82 per gross ton....
....	\$45.07 per gross ton....
....	\$36.96 per gross ton....

	HIGH		LOW	
1948....	\$46.82 Oct. 12		\$39.58 Jan. 6	
1947....	37.98 Dec. 30		30.14 Jan. 7	
1946....	30.14 Dec. 10		25.37 Jan. 1	
1945....	25.37 Oct. 23		23.61 Jan. 2	
1944....	\$23.61		\$23.61	
1943....	23.61		23.61	
1942....	23.61		23.61	
1941....	\$23.61 Mar. 20		\$23.45 Jan. 2	
1940....	23.45 Dec. 23		22.61 Jan. 2	
1939....	22.61 Sept. 19		20.61 Sept. 12	
1938....	23.25 June 21		19.61 July 6	
1937....	23.25 Mar. 9		20.25 Feb. 16	
1936....	19.74 Nov. 24		18.73 Aug. 11	
1935....	18.84 Nov. 5		17.83 May 14	
1934....	17.90 May 1		16.90 Jan. 27	
1933....	16.90 Dec. 5		13.56 Jan. 3	
1932....	14.81 Jan. 5		13.56 Dec. 6	
1931....	15.90 Jan. 6		14.79 Dec. 15	
1930....	18.21 Jan. 7		15.90 Dec. 16	
1929....	18.71 May 14		18.21 Dec. 17	

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

SCRAP STEEL

....	\$43.16 per gross ton....
....	\$43.16 per gross ton....
....	\$43.16 per gross ton....
....	\$42.58 per gross ton....

	HIGH		LOW	
1948....	\$43.16 July 27		\$39.75 Mar. 9	
1947....	42.58 Oct. 28		29.50 May 20	
1946....	31.17 Dec. 24		19.17 Jan. 1	
1945....	19.17 Jan. 2		18.92 May 22	
1944....	19.17 Jan. 11		15.76 Oct. 24	
1943....	\$19.17		\$19.17	
1942....	19.17		19.17	
1941....	\$22.00 Jan. 7		\$19.17 Apr. 10	
1940....	21.83 Dec. 30		16.04 Apr. 9	
1939....	22.50 Oct. 3		14.08 May 16	
1938....	15.00 Nov. 22		11.00 June 7	
1937....	21.92 Mar. 30		12.67 June 9	
1936....	17.75 Dec. 21		12.67 June 8	
1935....	13.42 Dec. 10		10.33 Apr. 29	
1934....	13.00 Mar. 13		9.50 Sept. 25	
1933....	12.25 Aug. 8		6.75 Jan. 3	
1932....	8.50 Jan. 12		6.43 July 5	
1931....	11.33 Jan. 6		8.50 Dec. 29	
1930....	15.00 Feb. 18		11.25 Dec. 9	
1929....	17.58 Jan. 29		14.08 Dec. 8	

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio		Detroit	Johns- town	Seattle, S. Frisco, Los Angeles	Fontana
INGOTS															
Carbon forging	\$50.00														
Alloy	\$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling ¹²	\$52.00				\$52.00	\$52.00	(per net ton)						\$52.00		
Carbon forging billets	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	(per net ton)						\$61.00		
Alloy	\$63.00	\$63.00				\$63.00	(Bethlehem, Canton, Massillon = \$63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.05 ¹³ 4.10 ¹⁴	
SHEETS															
Hot-rolled ⁶	3.25 to 3.30	3.25	3.25	3.25-3.30	3.25	3.25	3.25	3.25		Warren, Ashland = 3.25		3.45		3.95 ¹⁵	5.65
Cold-rolled ¹	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton = 4.40	4.40	Ashland = 4.40			5.15 ¹⁵	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes ² (10 gage)	4.80		4.80							4.80					
STRIP															
Hot-rolled ³	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	5.90
Cold-rolled ⁴	4.00	4.25		4.00	4.00	4.00	4.00	4.00		New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.50			7.10
TINPLATE															
Cokes, 1.50 lb. ⁸ base box	\$6.80	\$6.80	\$6.80		\$6.80			\$6.80	\$7.00	Warren, Ohio = \$6.80				Pittsburg, Cal. = \$7.55	
Electrolytic 0.25, 0.60, 0.75 lb. box	Deduct \$1.00, 80¢ and 60¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct 90¢ from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55-70 lb, 75-95 lb, 100-128 lb	Deduct \$1.80, \$1.70 and \$1.80 respectively from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga. ¹⁰	4.75	4.75	4.75					4.85							
BARS															
Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton = 3.35	3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet) ⁷	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton = 3.35		3.35	4.05 to 4.10	5.30
Cold-finished ⁵	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75		Bethlehem, Canton, Massillon = 3.75			4.05	3.75	4.80 ¹⁴	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65		Massillon = 4.65		Worcester 4.95				
PLATE															
Carbon steel ¹¹	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40 Conshohocken	3.45 ohocken	3.40 = 3.95		Coatesville = 3.75, Claymont = 3.95 Geneva, Utah = 3.40, Harrisburg = 6.50			3.65	3.45	4.30 ¹⁶	5.80
Floor plates	4.55	4.55		4.55					Conshohocken = 4.55						
Alloy	4.40	4.40							Coatesville = 5.10						
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30			Bethlehem = 3.30, Geneva, Utah = 3.25				3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE ⁹															
Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25	Duluth = 4.15, Worcester = 4.45				4.15	5.15 ¹³	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester = 5.50 New Haven, Trenton = 5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	313	347	410	416	430
Ingots, rerolling.....	12.75	13.50	15.00	14.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling.....	17.00	18.25	20.25	18.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings.....	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging.....	24.25-26.50	24.25-26.50	26.25-28.75	25.50-27.75	39.00-42.75	32.75-35.75	19.50-21.50	20.00-21.75	20.00-21.75
Bars, wire, structurals.....	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates.....	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets.....	37.50-40.75	37.50-40.75	39.50-43.00	39.50-43.00	53.00-57.25	50.00-54.00	33.00	33.50	35.50
Strip, hot-rolled.....	24.25	25.75	30.00	27.75	48.00	38.75	21.25	28.00	21.75
Strip, cold-rolled.....	30.50-30.75	33.00-33.50	36.50-39.50	35.00-35.75	55.00-57.25	48.50-50.00	27.00	33.50	27.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	\$1.42
18	4	2	—	—	\$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢
High-carbon-chromium.....					52¢
Oil harden manganese.....					29¢
Special carbon.....					26.5¢
Extra carbon.....					22¢
Regular carbon.....					19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon.....	4.00¢
0.41 to 0.60 carbon.....	5.50¢
0.61 to 0.80 carbon.....	6.10¢
0.81 to 1.05 carbon.....	8.05¢
1.06 to 1.35 carbon.....	10.35¢

Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Coatesville, Pa.....	27.00	
Washington, Pa.....	26.50	22.50
Claymont, Del.....	26.50	
Conshohocken, Pa.....		22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.....		27.50
Inconel-clad		
10 pct, f.o.b. Coatesville.....		36.00
Monel-clad		
10 pct, f.o.b. Coatesville.....		29.00
Aluminized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.....		9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base per 100 lb	Pittsburg, Calif.
Standard & coated nails*.....	103	123
Galvanized nails*.....	103	123
Woven wire fence†.....	109	132
Fence posts, carloads††.....	114	
Single loop bale ties.....	106	130
Galvanized barbed wire**.....	123	143
Twisted barbed wire.....	123	

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

Base per 100 lb Pittsburg, Calif.

Annealed fence wire†.....	\$4.80	\$5.75
Annealed, galv. fencing†.....	5.25	6.20
Cut nails, carloads††.....	6.75	

† Add 30¢ at Worcester; 10¢ at Sparrows Pt.
†† Less 20¢ to jobbers.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature.....	5.45
Electrical.....	5.95
Motor.....	6.70 to 9.20
Dynamo.....	7.50 to 10.00
Transformer 72.....	8.05 to 11.80
Transformer 65.....	8.60 to 12.35
Transformer 58.....	9.30 to 13.05
Transformer 52.....	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 O.H., per 100 lb.....	\$3.20
Joint bars, 100 lb.....	4.25
Light rails (from billets) per 100 lb.....	3.55

Base Price cents per lb

Track spikes.....	5.35
Axles.....	5.20
Screw spikes.....	8.00
Tie plates.....	4.05
Tie plates, Pittsburg, Calif.*.....	4.20
Track bolts, untreated.....	8.25
Track bolts, heat treated, to railroads.....	8.50

*Seattle, add 30¢.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayarl R	Otiscoloy	Yaloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates.....	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.20	5.65
Sheets									
Hot-rolled....	4.95	4.95	4.95	5.25	4.95	4.95	4.95	4.95	5.25
Cold-rolled....	6.05	6.05	6.05	....	6.05	6.05	6.05	6.05	6.35
Galvanized....	....	8.75	....	....	....	6.75	....	....	....
Strip									
Hot-rolled....	4.95	4.95	4.95	....	4.95	4.95	4.95	4.95	5.25
Cold-rolled....	....	....	6.05	....	....	6.05	6.05	....	6.35
Shapes.....	....	4.95	....	....	4.95	5.05	4.95	....	....
Beams.....	....	4.95	....	....	....	....	....	....	....
Bars									
Hot-rolled....	5.10	5.10	5.10	....	5.10	5.10	5.10	....	5.40
Bar shapes.....	....	5.10	....	....	5.10	5.10	5.10	....	....

PIPE AND TUBING

Base discounts, f.o.b. mills,
steel butt weld and seamless.
Base price, \$200.00 per net ton.

Standard, threaded and coupled

Steel, butt weld	Black	Galv.*
1/2-in.	46	26 1/2
1-in.	48 1/2	29 1/2
1 1/2-in.	49	30
2-in.	49 1/2	30 1/2
2 1/2-in.	50	31
3-in.	50 1/2	31 1/2
Wrought iron, butt weld		
1/2-in.	+20 1/2	+50
1-in.	+10 1/2	+39
1 1/2-in.	+4 1/2	+30
2-in.	+1 1/2	+26 1/2
2 1/2-in.	+2	+26

Steel, lap weld		
2-in.	39 1/2	20
2 1/2 and 3-in.	43 1/2	24
3 1/2 to 6-in.	45 1/2	26

Steel, seamless		
3-in.	38 1/2	19
2 1/2 and 3-in.	41 1/2	22
3 1/2 to 6-in.	43 1/2	24

Wrought iron, lap weld		
2-in.	+7 1/2	+34
2 1/2 to 3 1/2-in.	+5	+29 1/2
4-in.	+11 1/2	+23 1/2
4 1/2 to 8-in.	+2	+25

Extra Strong, plain ends

Steel, butt weld		
1/2-in.	41	22
1-in.	45	26
1 1/2-in.	47	29
2-in.	47 1/2	29 1/2
2 1/2-in.	48	30
3-in.	48 1/2	30 1/2
3 1/2 and 3-in.	49	31
Wrought iron, butt weld		
1/2-in.	+16	+44
1-in.	+9 1/2	+37
1 1/2 to 2-in.	+1 1/2	+26

Steel, lap weld		
2-in.	38 1/2	20
2 1/2 and 3-in.	43 1/2	25
3 1/2 to 6-in.	45 1/2	26

Steel, seamless		
3-in.	37 1/2	19
2 1/2 and 3-in.	41 1/2	23
3 1/2 to 6-in.	45	26 1/2

Wrought iron, lap weld		
2-in.	+4 1/2	+30 1/2
2 1/2 to 4-in.	+5	+19
4 1/2 to 6-in.	+1	+23 1/2

Basing discounts for standard pipe are for threads and couplings. For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all butt weld. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

*Two firms charge 1/2 point lower discount on galvanized steel pipe and tubing.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD Gage	Seamless	Electric Weld
in. in. BWG	H.R.	C.R.
2 13	19.18	22.56
2 1/2 12	25.79	30.33
3 12	28.68	33.76
3 1/2 11	35.85	42.20
4 10	44.51	52.35

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	\$106.70
6 to 24-in., del'd N. Y.	103.50 to 108.40
6 to 24-in., Birmingham	93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	120.30
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
1/2 in. & smaller x 6 in. & shorter	35
9/16 & 5/8 in. x 6 in. & shorter	37
3/4 in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

1/2 in. and smaller	35
9/16 to 1 in. inclusive	34
1 1/4 to 1 1/2 in. inclusive	32
1 1/2 in. and larger	27
On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.	

Semifin. Hexagon Nuts

	USS	SAE
7/16 in. and smaller	41	41
1/2 in. and smaller	38	38
1/2 in. through 1 in.	39	39
9/16 in. through 1 in.	37	37
1 1/4 in. through 1 1/2 in.	35	37
1 1/2 in. and larger	28	28
In full case lots, 15 pct additional discount.		

Stove Bolts

Packages, nuts separate	\$61.75
In bulk	70.00

Large Rivets

	(1/2 in. and larger)
	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

	(7/16 in. and smaller)
	Pct Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

	(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46	
1/2 to 1 in. x 6 in., SAE (1035), heat treated	35	
Set screws, oval points	19	
Milled studs	5	
Flat head cap screws, listed sizes	23	
Fillister head cap, listed sizes	23	

FLUORSAPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

	Base price per net ton
Effective CaF ₂ Content:	
70% or more	\$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	\$6.60
Old range, nonbessemer	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDER

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f.	7.9¢ to 9.0¢
New York, ocean bags	9.0¢ to 15.0¢
Domestic sponge iron, 98+ % Fe, carload lots	19.5¢ to 39.5¢
Electrolytic iron, annealed, 99.5+ % Fe	48.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+ % Fe	63.0¢ to 80.0¢
Hydrogen reduced iron, minus 300 mesh, 98+ % Fe	90.0¢ to 175.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	30.00¢
Aluminum	51.17¢
Antimony	27.25 to 37.25¢
Brass, 10 ton lots	33.62¢
Copper, electrolytic	34.25¢
Copper, reduced	\$2.55
Cadmium	35.50
Chromium, electrolytic, 99% min.	25.80¢
Lead	55.00¢
Manganese	\$2.55
Molybdenum, 99%	66.00¢
Nickel, unannealed	68.00¢
Nickel, spherical, minus 30 mesh, unannealed	34.00¢
Silicon	8.5¢ plus metal cost
Solder powder	75.0¢
Stainless steel, 302	\$1.155
Tin	\$2.90
Tungsten, 95%, 99%	17.75 to 22.25¢
Zinc, 10 ton lots	

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	\$14.50 to \$15.50
Connellsville, Pa.	\$16.00 to \$18.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	
Foundry, Byproduct	
Buffalo	\$22.65
Chicago, del'd	23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa., f.o.b.	20.50
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

	Carloads, Per 1000
Fire Clay Brick	
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add \$5)	\$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	11.50

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	\$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	\$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00

	Per Net Ton
Chrome Brick	
Standard chemically bonded, Balt., Chester	\$69.00

Magnesite Brick	
Standard, Balt. and Chester	\$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite	
Std. 1/2-in. grains	
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	\$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	\$30.50 to 31.00
In sacks with fines	35.00 to 35.50

Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢	\$12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	\$5.15- 5.71	\$6.31- 6.57	\$7.27- 7.47	\$5.35- 5.88	\$6.51- 6.88	\$5.37- 5.62	\$5.09- 5.24	\$5.35- 5.67	\$6.16- 6.31	\$9.14	\$9.29	\$10.54	\$10.89
New York	5.40- 5.98	6.28- 6.43	7.25- 7.73	5.88- 6.48	6.73- 7.33	5.78	5.32- 5.68	5.53- 5.83	6.18- 6.38	9.17- 9.53	9.32- 9.68	10.40- 10.77	10.55- 10.92
Boston	5.48- 5.64	6.39- 6.59	7.68- 7.89	6.54- 6.79	7.75- 7.99	5.74	5.39- 5.64	5.48- 5.69	6.24- 6.34	9.40- 9.44	9.55- 9.59	10.84- 10.94	10.92- 11.09
Baltimore	5.28- 5.38	6.18- 6.38	7.15- 7.38	5.34- 5.88	6.34- 6.88	5.53	5.33- 5.39	5.39- 5.48	6.13- 6.31	9.14	9.29	10.54	10.89
Chicago	4.85- 5.10	5.75- 5.95	6.85- 7.05	4.85- 5.30	6.15- 6.32	5.10	4.90- 5.07	4.90- 5.07	5.70- 5.87	9.36	9.60	10.40	10.55
Milwaukee	5.02- 5.07	5.92- 6.07	7.12- 7.22	5.02- 5.37	6.32- 6.32	5.22- 5.27	5.07- 5.07	5.07- 5.07	5.87- 5.87	9.15- 9.17	9.32- 9.32	10.52- 10.57	10.67- 10.72
Norfolk	5.75- 4.95	6.75- 5.75 ¹	7.18- 7.18	5.02- 5.02	6.70- 6.70	5.35- 5.35	5.16- 5.16	5.15- 5.15	5.70- 5.70	9.14- 9.14	9.29- 9.29	10.54- 10.54	10.69- 10.69
Cleveland	5.20- 4.85	6.04- 5.75	7.24- 7.55	5.65- 5.55	6.35- 6.35	5.45- 5.45	5.10- 5.10	5.15- 5.15	5.90- 5.90	9.05- 9.05	9.40- 9.40	10.75- 10.75	20.90
Buffalo	5.10- 5.20	5.85- 6.05	7.05- 7.45	5.55- 5.25	6.25- 6.25	5.50- 5.50	5.30- 5.30	5.30- 5.30	6.02- 6.02	9.31- 9.31	9.20- 9.20	10.72- 10.72	10.87- 10.87
Detroit	5.55- 5.14	6.50- 5.82	7.45- 6.97	5.70- 5.25	6.55- 6.31	5.55- 5.50	5.37- 5.30	5.52- 5.30	6.07- 6.06	9.55- 9.31	9.47- 9.50	10.95- 10.75	11.10- 10.90
Cincinnati	5.38 ⁸ - 5.19	6.21 ⁸ - 6.04	7.29- 7.39	5.62 ⁸ - 5.19	6.49- 6.49	5.71 ⁸ - 5.44	5.47 ⁸ - 5.24	5.62 ⁸ - 5.24	6.17 ⁸ - 6.04	9.35- 9.69	9.51- 9.94	10.76- 10.74	10.91- 10.89
St. Louis	4.85- 4.90	5.75 ¹ - 6.09	6.85- 7.05	5.00- 5.35	5.95- 5.35	5.05- 5.25	4.90- 5.15	4.90- 5.10	5.65- 5.80	9.35	9.60	10.40	10.55- 10.80
Pittsburgh	5.41- 5.92	6.31- 6.38	7.30- 7.61	5.41- 5.92	6.31- 6.38	5.68- 5.17	5.48- 5.97	5.48- 5.97	6.28- 6.77	9.01	10.10	10.98	11.11
St. Paul	5.92- 5.05 ¹	6.38- 6.38	7.61- 8.45 ²	5.92- 5.05 ¹	6.38- 6.38	5.17- 5.25 ¹	5.97- 5.00 ¹	5.97- 5.00 ¹	6.77- 6.66	9.35	9.60	10.40	10.55- 10.80
Omaha	6.40- 6.30	7.85 ¹ - 7.90	8.80- 8.55	6.75- 6.88	9.35 ⁵ - 8.25	6.35- 5.95	6.20- 5.75	6.40- 6.08	7.60- 7.85 ¹	9.80	9.65	10.75	10.95
Birmingham	6.40- 5.95 ⁸	7.85 ¹ - 7.15 ²	8.80- 8.05	6.75- 6.88	9.35 ⁵ - 8.25	6.35- 6.30	6.20- 5.90	6.40- 5.90	7.60- 7.55	9.80	9.65	10.75	10.95
Houston	6.40- 5.95 ⁸	7.85 ¹ - 7.15 ²	8.80- 8.05	6.75- 6.88	9.35 ⁵ - 8.25	6.35- 6.30	6.20- 5.90	6.40- 5.90	7.60- 7.55	9.80	9.65	10.75	10.95
Los Angeles	6.40- 5.95 ⁸	7.85 ¹ - 7.15 ²	8.80- 8.05	6.75- 6.88	9.35 ⁵ - 8.25	6.35- 6.30	6.20- 5.90	6.40- 5.90	7.60- 7.55	9.80	9.65	10.75	10.95
San Francisco	6.40- 5.95 ⁸	7.85 ¹ - 7.15 ²	8.80- 8.05	6.75- 6.88	9.35 ⁵ - 8.25	6.35- 6.30	6.20- 5.90	6.40- 5.90	7.60- 7.55	9.80	9.65	10.75	10.95
Portland	6.50 ⁴ - 6.20 ⁴	8.00 ² - 7.75 ²	9.15 ² - 8.45 ²	6.85 ⁴ - 6.55 ⁴	8.25- 8.25	6.30 ⁴ - 6.20	6.25 ⁴ - 6.15	6.25 ⁴ - 6.05 ⁴	8.25 ⁴ - 8.00 ¹⁴	10.45 ¹⁵ - 10.30 ¹⁵	10.45 ¹⁵ - 10.30 ¹⁵	12.05 ¹⁵ - 12.00 ¹⁵	12.05 ¹⁵ - 12.00 ¹⁵
Seattle	6.30 ⁴ - 6.15- 8.00	7.85 ² - 7.35	9.00- 7.90- 9.06	6.65 ⁴ - 7.10- 7.45	8.25- 8.25	6.30- 6.25- 6.65	6.25- 6.15- 7.00	6.15 ⁴ - 6.05 ⁴ - 7.25	8.10 ¹⁴ - 8.00 ¹⁴ - 8.40	10.40 ¹⁵ - 10.30 ¹⁵ - 10.40	10.40 ¹⁵ - 10.30 ¹⁵ - 10.40	12.05 ¹⁵ - 12.00 ¹⁵ - 12.05	12.05 ¹⁵ - 12.00 ¹⁵ - 12.05
Salt Lake City	6.15- 8.00	7.35- 8.00	7.90- 9.06	7.10- 7.45	8.25- 8.25	6.25- 6.15- 7.00	6.15- 6.05- 7.00	6.05 ⁴ - 6.05 ⁴ - 7.25	8.00 ¹⁴ - 8.00 ¹⁴ - 8.40	10.30 ¹⁵ - 10.30 ¹⁵ - 10.40	10.30 ¹⁵ - 10.30 ¹⁵ - 10.40	12.00 ¹⁵ - 12.00 ¹⁵ - 12.05	12.00 ¹⁵ - 12.00 ¹⁵ - 12.05

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb;

strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to

9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES						DELIVERED PRICES† (BASE GRADES)							
Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	43.38	47.50	47.00	51.00	Boston	Everett	\$0.50 Arb.	48.75	49.25	55.77	60.27	
Birmingham	42.88	43.38	47.50	47.00	51.00	Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Buffalo	47.00	47.00	47.50	47.00	51.00	Brooklyn	Bethlehem	3.90	51.90	51.90	51.90	51.90	51.90
Chicago	48.00 [*]	48.00 [*]	48.50 [*]	48.00	51.00	Cincinnati	Birmingham	6.09	48.97	49.47	49.47	49.47	49.47
Cleveland	46.00	46.00	46.50	46.00	51.00	Jersey City	Bethlehem	2.39	50.39	50.39	50.39	50.39	50.39
Duluth	46.00	46.00	46.50	46.00	51.00	Los Angeles	Provo	6.93	52.93	53.43	53.43	53.43	53.43
Erie	45.50	46.00	46.50	46.00	51.00	Mansfield	Cleveland-Toledo	3.03	49.03	49.53	49.53	49.53	49.53
Everett	48.75	49.25	55.77	60.27	60.27	Philadelphia	Bethlehem	2.21	50.21	50.21	50.21	50.21	50.21
Granite City	47.90	48.40	48.90	48.40	51.00	Philadelphia	Swedeland	1.31	50.31	51.81	52.31	52.81	52.81
Neville Island	46.00	46.50	47.00	46.50	51.00	Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	52.81
Provo	46.00	46.50	47.00	46.50	51.00	San Francisco	Provo	6.93	52.93	53.43	53.43	53.43	53.43
Sharpsville	48.00	48.50	49.00	48.50	51.00	Seattle	Provo	6.93	52.93	53.43	53.43	53.43	53.43
Steelton	48.00	48.50	49.00	48.50	51.00	St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	49.65	49.65
Struthers, Ohio	46.00	46.50	47.00	46.50	51.00								
Swedeland	50.00	50.50	51.00	50.50	51.00								
Teledo	45.50	46.00	46.50	46.00	51.00								
Troy, N. Y.	46.00	46.50	47.00	46.50	51.00								
Youngstown	46.00	46.50	47.00	46.50	51.00								

* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00

pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —\$56.50; f.o.b. Buffalo \$60.75. Add \$1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct

Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$66.00 per gross ton, f.o.b. Lysles, Tenn. Delivered Chicago, \$73.78. High phosphorus charcoal pig iron is not being produced.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.	
c.o.b. Birmingham	\$162
c.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	\$160
c.o.b. Johnstown, Pa.	\$162
c.o.b. Sheridan, Pa.	\$160
c.o.b. Rockwood, Tenn.	\$165
c.o.b. Etina, Pa.	\$163
\$2.00 for each 1% above 82% Mn; penalty, \$1.80 for each 1% below 78%.	
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.	
Carload, bulk	10.0
on lots	11.6
Less ton lots	12.5

Piegeleisen

Contract prices, gross ton, lump, f.o.b.	
16-19% Mn	19-21% Mn
3% max. Si	3% max. Si
Almerton, Pa.	\$61.00
gh. or Chicago	\$62.00
	\$60.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.	
Carload, packed	35.5
on lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.	
Carloads	32
on lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.			
	Carloads	Ton	Less
0.07% max. C. 0.06%			
P, 90% Mn.	25.25	27.10	28.30
10% max. C.	24.75	26.60	27.80
15% max. C.	24.25	26.10	27.30
30% max. C.	23.75	25.60	26.80
50% max. C.	23.25	25.10	26.30
75% max. C.			
7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 3-20% Si, 1.5% max. C.	
Carload bulk	8.60
on lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
on lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth \$81.00, foundry, \$82.00; \$1.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add \$1.00 per ton for each additional 0.50% Si up to and including 8%. Add \$1.00 for each 0.50 pct Mn over 8%.	
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Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.	
2% Si, 2% Fe.	20.70
2% Si, 1% Fe.	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.	
Carload, bulk	5.90
on lots	7.50
Less ton lots	8.40

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.	
1% Si	17.50
2% Si	10.50
3% Si	13.00
4% Si	14.65
4.95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.			
	Cast Turnings Distilled		
on lots	\$2.05	\$2.95	\$3.75
less ton lots	2.40	3.30	4.55

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered.	
0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35
Briquets—Contract price, cents per pound of briquet, delivered, 60% chromium.	
Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.	
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S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.	
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carload	21.60
Ton lots	23.75
Less ton lots	25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.	
Carload	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb. chromium contained packed, delivered, ton lots. 97% min. Cr. 1% max. Fe.	
0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb of alloy, lump, delivered.	
30-33% Ca, 60-65% Si, 3.00% max. Fe.	
Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.	
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	19.75
Less ton lots	21.00

V Foundry Alloys

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max.	
St. Louis. V-5: 33-42% Cr, 17-19% Si, 8-11% Mn. V-7: 28-32% Cr, 15-21% Si, 14-16% Mn.	
Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 56%, Ti 9%, Ca 5%.	
Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.	
Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	\$2.25
Ferrovandium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	\$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V ₂ O ₅ , contract basis, per pound Contained V ₂ O ₅	\$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	\$2.75
Less ton lots	\$2.80
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide briquets, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide in bags, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti.	\$1.23
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti.	\$1.35
Less ton lots	1.40
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	\$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.40¢
Ton lots	9.30¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00
Ton lots, packed	11.75
Boron Agents	
Contract prices per pound of alloy, delivered.	
Ferroboration, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. X D.	
Ton lot	\$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. X D, delivered.	
Ton lots	\$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	\$1.80
Silicaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	83¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	\$6.25



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Pays Millionth Dollar for Employee Idea

Pittsburgh

• • • Officials of Westinghouse Electric Corp. have disclosed that the company has passed the "million-dollar milestone" in cash paid to employees who have suggested new and better ways to do their jobs.

The millionth dollar went to Anthony Pospisil, 56-year-old toolmaker at the company's Newark, N. J., Meter Div. plant, whose idea for a tool improvement brought him a check for \$350. His suggestion called for a new die which would make possible the manufacture of terminal brackets for watt-hour meter sockets in one operation instead of two. It was his tenth suggestion and the fifth one to win a cash award.

T. O. Armstrong, Westinghouse director of plant labor relations, has reported that the suggestion, along with 4881 others accepted during the first 6 months this year, brought total suggestion awards paid since 1910 to \$1,021,303. Half of this total has been paid during the last 5 years. During the half-year period just completed, Westinghouse has paid \$72,366 to 2859 employees. A total of 14,289 suggestions was turned in—3000 more than during the same period last year. Throughout the corporation there were 99 awards of more than \$100 during the 6-month period and many employees received large additional awards for suggestions adopted last year.

Public Interest Seen in Statistics

New York

• • • Voluntary steel allocations, preliminary European Recovery Program allotments and other important national undertakings, make complete and accurate industry-wide statistics more important today than ever before, George S. Rose, secretary of the American Iron and Steel Institute, recently told members of the Metal Manufacturing Div., Controllers' Institute of America.

In addition, he said, this country is moving into both political and economic situations where the margin for error is growing consistently smaller. "One mistake can prove serious, for industry, for the country or perhaps the world," he added. "So we must have the proper facts if we are to do the job right."

He reported that legal aspects of collection and dissemination of industry statistics have been fairly well settled, although not many cases involving this question have been brought before the Supreme Court. Mr. Rose added that, "It is clear from the few cases in question the court feels adequate publicity must be given to statistics after they have been collected."

It is the consensus of economists and many of the most important government agencies that the public interest is served by the gathering and dissemination of statistics in the widest possible manner. But in more than a legal sense, business and industry statistics have become public property.

"It is no longer possible," Mr. Rose said, "for business to give convincing answers to questions or criticisms without putting facts on the line. Industry cannot sell itself without the facts. It is up to each of us to collect the facts and circulate them as widely as possible—to employee groups, to the community and to the general public."



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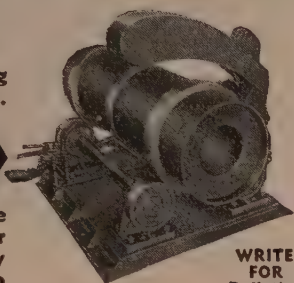
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SPUR GEARS—Fellows Generated—to 140" dia., 8" face, up to 1 D.P.

SPUR GEARS—Ground tooth up to 18" dia., 12" face—2 D.P.

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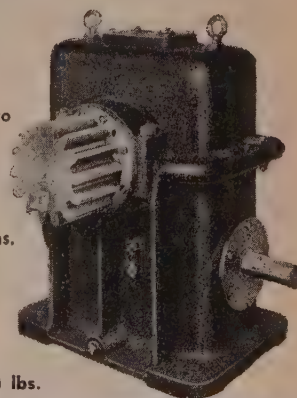
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Evolution Cited in Steel's Raw Materials

Pittsburgh

• • • Many changes have been made in this country in the raw materials used to make steel, Dr. Karl L. Feters, special metallurgical engineer, Youngstown Sheet & Tube Co., told the Pittsburgh regional technical meeting of the American Iron & Steel Institute.

"As the tonnage steel processes came into being, the great Lake Superior ore district was developed along with the high grade coking coal deposits of Pennsylvania and West Virginia," Dr. Feters pointed out.

"These seemingly inexhaustible resources of good quality raw materials have made possible our industrial development from the days of the first wrought iron rails to the high quality steels in wide selection of grades needed for modern railroad systems."

He said, in the steel industry, as in many other industries, the problem of exhaustion of high grade raw materials has been met by improvements in technology.

"The unprecedented tonnage requirements of steel during World War II and the heavy postwar demands have used up the choice raw materials at a rate greater than can be met by technological advances and have been accompanied by requirements of quality and composition control of steel products undreamed of only a few years ago."

Dr. Feters presented a table which showed increased steel production from openhearth furnaces with the use of increased amounts of hot iron. This ranged from 10.1 tons per hour in a 150-ton furnace with 40 pct molten iron, to 14.9 tons per hour with 65 pct hot iron.

"The openhearth operator desires iron low in sulfur, and silicon as low as compatible with his specific practice," Dr. Feters said. "The blast furnace operator has the task of furnishing the iron. The ease with which he accomplishes this task, and the degree of success in meeting the requirements, depends to a great deal on the raw materials available."

In recent years, he pointed out, the iron content of Lake Superior ore has decreased while the silica content has increased. A table showed that in the last 6 years the iron content of typical blast furnace ores has declined from 51.8 to 50.42 pct while silica content has increased from 7.73 to 8.92 pct.

Ash and sulfur content are important characteristics in coke. Ash increases fluxing costs and fuel consumption while sulfur increases fluxing cost and fuel rate and adversely affects the sulfur content of pig iron.

Ash and sulfur contents of coal have increased in recent years, mainly for two reasons; working lower grade coal deposits and the introduction of mechanized mining which generally necessitates mining the entire seam rather than selected parts. Coal washing has been installed at many mines, but this only removes part of the ash and sulfur contents, which still are above levels of a few years ago.

The present available quality of limestone is fairly good so this is causing no serious problem at present, Dr. Feters said.

In the openhearth high sulfur pig iron increases limestone needs, slag volume and the time required

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for making a heat, and in general is reflected in the quality of steel throughout its processing. High silicon increases limestone needed, time required for a heat, may make it more difficult to eliminate sulfur and increases erosion of furnace banks.

Scrap, of which large quantities are used in openhearth furnaces, may contain sulfur, copper, nickel, tin and other elements which cause delays, divert heats, result in bad bottoms and other difficulties in openhearth operation.

"Shortages of scrap are still a problem, and there seems to be no immediate remedy for this. It has been estimated that 170 million tons of steel were sent overseas during the recent war, and the return of scrap to the mills from this tonnage of product has been slow, uncertain and in many cases impossible."

Openhearth operators must contend with the high sulfur content of oil or gas used in the furnaces. Some desulfurization of oil may be a necessity in the future, he predicted.

Increased alumina content of silica brick used for openhearth furnaces has resulted in shorter roof life, reducing furnace production. Shortage of skilled labor has resulted in more time being required to make furnace repairs.

New Steel Features High Strength and High Toughness

(CONTINUED FROM PAGE 80)

microchemical segregation.

It has been found that homogeneous austenite formed in HY-Tuf at temperatures over A_3 is extremely sluggish in its transformation at high temperatures and therefore a high austenitizing temperature is ruled out for annealing procedures. Consequently, to develop low hardness in a reasonable time the steel must be heated at temperatures between 1300° and 1350°F (in which range it consists of this peculiar mixture of ferrite and austenite) and then transformed at 1200°F for at least 15 hr. The progress of transformation at 1200°F is shown in fig. 19.

It will be observed that remnants of the lamellar orientation of the austenite areas are still visible after a 16-hr holding at 1200°F, but these areas (presumably martensite in the quenched section) are not much larger than the carbides produced during the high temperature transformation of the austenite, and therefore should be no more obstructive in the machining of the steel than the carbides themselves. At any rate, with a structure similar to that shown in fig. 19c, HY-Tuf has been reported to machine as satisfactorily as annealed 4340.

It has been demonstrated in this article that HY-Tuf, at a tensile strength of about 235,000 psi, has better notch impact resistance than conventional construction steels heat treated to the same tensile strength, and also has less sensitivity than conventional steels to notch effects both in static tensile, and in rotating-beam fatigue tests. The steel also has high hardenability so that it can be treated to high strength in large sections. Furthermore, in spite of its high hardenability, it can be flash welded satisfactorily and can also be arc welded. HY-Tuf cannot be carburized as readily as some of the conventional carburizing steels, and it is not recom-

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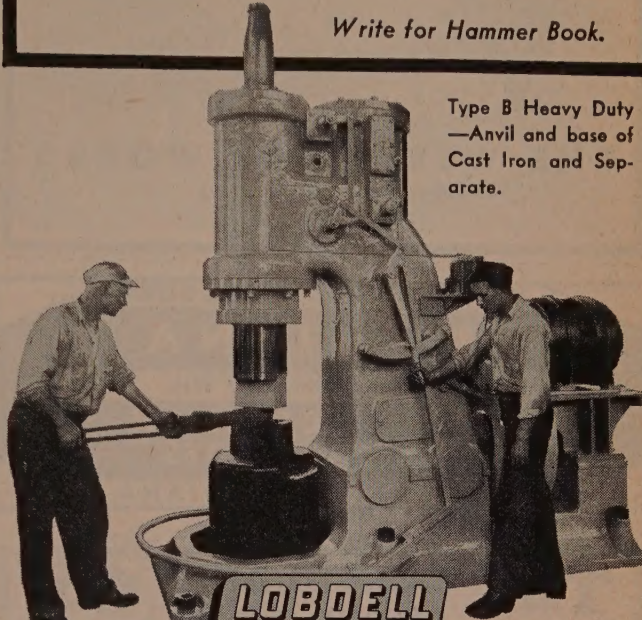
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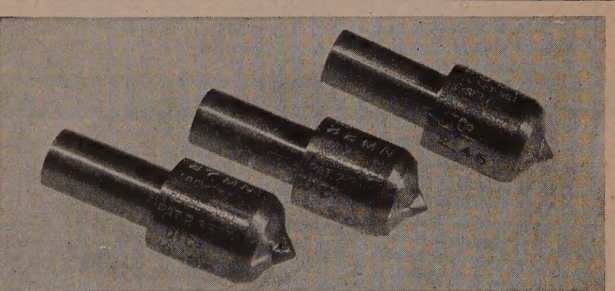
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mended for carburized parts. However it can be treated in a cyanide bath to develop a thin case of high hardness on a core of high strength and tough-

The authors acknowledge the assistance of A. Allten, F. Baureis, G. Ebel, A. Frumkin, G. Stefanelli and other colleagues in the research laboratory in the preparation of this article.

ness. Finally, although this steel is not amenable to short time annealing cycles, it can be treated by practical procedures to develop good machinability.

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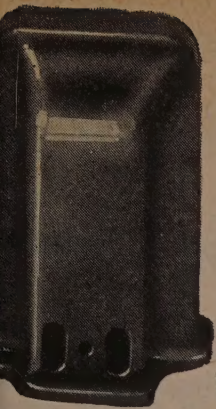
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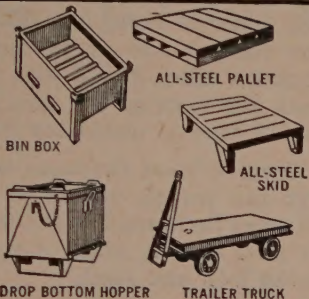
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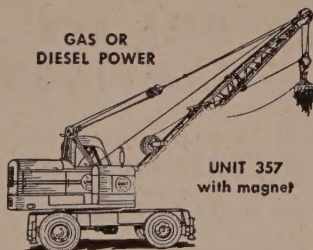
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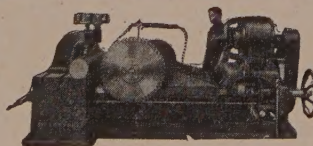
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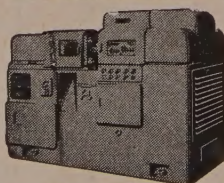
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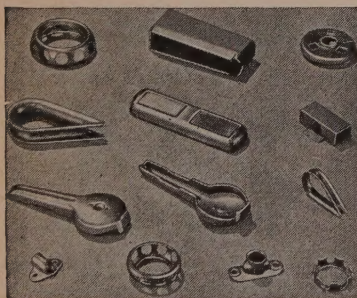
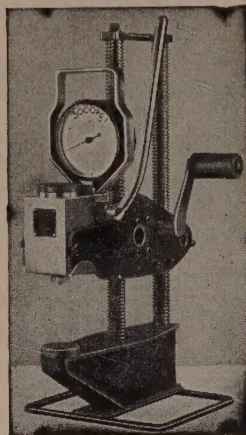
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Canadian Pig Iron Output Increases

Toronto

• • • Canadian production of pig iron for July amounted to 187,940 net tons which was an average daily rate of 80.6 pct of total rated capacity, and compares with 183,763 tons or 81.4 pct for the shorter month of June and with 157,153 tons in July last year.

For the month under review output included 150,282 tons of basic iron of which 140,527 tons were for further use of producing companies and 9755 tons for sale; 22,525 tons of foundry iron with 1398 tons for further use and 21,127 tons for sale; and 15,133 tons of malleable iron all for sale.

Twelve blast furnaces were in operation throughout the month out of a total of 14 and furnace charges included 325,413 tons of iron ore, 46,398 tons of mill cinder, scale, sinter, etc., and 8772 tons of scrap iron and steel.

For the first 7 months of this year pig iron production totaled 1,219,633 net tons compared with 1,130,306 tons in the like period of 1947 and 940,495 tons in 1946.

For July output of ferroalloys amounted to 12,939 net tons compared with 13,502 tons in the previous month and with 12,402 tons in July 1947. In the month under review output included by tonnage, ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-X, and ferrophosphorus.

Ferroalloys produced in the first 7 months of this year totaled 102,592 net tons against 90,152 tons in the 1947 period and 75,234 tons in 1946.

Following are comparative monthly production figures for pig iron and ferroalloys for 1947 and 1948 in net tons:

1947	Pig Iron	Ferroalloys
January	177,313	9,644
February	150,632	9,357
March	164,403	14,197
April	160,749	13,015
May	160,230	15,325
June	159,826	16,212
July	157,153	12,402
August	166,878	11,398
September	169,630	11,152
October	163,335	14,691
November	174,147	11,551
December	165,551	10,888
Total	1,969,847	149,832

1948	Pig Iron	Ferroalloys
January	160,042	17,125
February	151,123	11,823
March	172,675	14,293
April	170,785	14,474
May	193,305	18,436
June	183,763	13,502
July	187,940	12,939
Total, 7 months	1,219,633	102,592